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Miles City District Office

September 1994

FINAL
WESTERN ENERGY COMPANY COAL LEASE APPLICATION (MTM-80697) ENVIRONMENTAL IMPACT STATEMENT

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The Bureau of Land Management is responsible for the stewardship of our public lands. It is committed to manage, protect, and improve these lands in a manner to serve the needs of the American people for all times. Management is based on the principles of multiple use and sustained yield of our nation's resources within a framework of environmental responsibility and scientific technology. These resources include recreation; rangelands; timber; minerals; watershed; fish and wildlife; wilderness; air; and scenic, scientific, and cultural values.

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United States Department of the Interior

BUREAU OF LAND MANAGEMENT
MONTANA STATE OFFICE
222 NORTH 32ND STREET
P.O. BOX 36800
BILLINGS, MONTANA 59107-6800

TAKE PRIDE IN AMERICA

IN REPLY TO:

Dear Reader:

The final environmental impact statement on the Western Energy Company's coal lease application for federal coal lands in Rosebud County, Montana, is presented for your review and comment. The document analyzes the Preferred alternative to lease 2,061 acres of federal coal lands to Western Energy Company, a No Action alternative, and the Cultural Resource Avoidance alternative.

The draft environmental impact statement was issued on February 18, 1994. The comment period on the draft environmental impact statement was from February 18, 1994, through April 25, 1994. Nine comments were received on the draft environmental impact statement. Public meetings were held on March 7 at Lame Deer, Montana, with approximately 6 people attending; and March 8 at Colstrip, Montana, with approximately 8 people attending. This final environmental impact statement has been revised in response to these written and oral comments. Any additions to the draft in chapters 1 through 5, and the appendixes, are highlighted.

A Fair Market Value hearing will be held Tuesday, October 11, 1994, at 1:00 p.m. at the BLM Miles City District Office conference room on Garryowen Road, Miles City, Montana.

A 30-day comment period on this final environmental impact statement will begin on October 4, 1994. Comments received on the final environmental impact statement will be considered in preparation of the Record of Decision. Please address your comments to:

Bureau of Land Management
Powder River Resource Area
c/o Mary Alice Spencer
Area Manager
Miles City Plaza
Miles City, Montana 59301

Sincerely,

Francis R Cherry Jr

Francis R. Cherry, Jr.
Acting State Director

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FINAL

Environmental Impact Statement for the Western Energy Company Coal Lease Application (MTM-80697)

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prepared by
Bureau of Land Management
Powder River Resource Area
Miles City District Office

September 1994

Recommended by: Charles Frost Date: September 9, 1994
Charles Frost
District Manager, Miles City District Office

Approved by: Francis R Cherry Jr. Date: September 9, 1994
Francis R. Cherry, Jr.
Acting State Director, Bureau of Land Management
Montana and Dakotas

Cooperating Agencies:
Montana Department of State Lands
U.S. Office of Surface Mining Reclamation and Enforcement

ENVIRONMENTAL IMPACT STATEMENT

Draft ( ) Final (x)

LEAD AGENCY: Department of the Interior
Bureau of Land Management
Powder River Resource Area
Miles City, Montana

COOPERATING AGENCIES: Montana Department of State Lands
Lands Administration Division
Helena, Montana

U.S. Office of Surface Mining
Reclamation and Enforcement
Denver, Colorado

TYPE OF ACTION: Administrative

JURISDICTION: Rosebud County
Miles City District Office

ABSTRACT: This Final Environmental Impact Statement addresses the leasing of 2,061 acres of federal coal lands in and around the Rosebud Mine to Western Energy Company. The lands involved are all private surface overlying federal coal, except for one parcel in Area B. There are 35.6 million tons of recoverable coal reserves on these lands. Three alternatives were considered. The Preferred alternative would lease the federal coal lands to Western Energy Company with additional mitigation measures. The No Action alternative would deny the coal lease application. Under the Cultural Resource Avoidance alternative, the coal lease application would be partially approved.

ACKNOWLEDGEMENT

The BLM regrets to announce the death of William (Bill) L. Matthews, on March 10, 1994. Bill served as the project manager for preparation of the draft Western Energy Environmental Impact Statement. He was involved with the coal program for many years and he will be missed.

EXECUTIVE SUMMARY

Western Energy Company (WECo) submitted an application to the Bureau of Land Management (BLM) for 2,061 acres of federal coal lands around the existing Rosebud Mine. The lands involved are all private surface overlying federal coal lands within Area C, except for one parcel in Area B.

There are 35.6 million tons of recoverable coal reserves on these lands. This environmental impact statement addresses the socioeconomic and environmental impacts that would likely result from leasing these federal coal lands, the cumulative impacts of the coal lease application, and the irreversible and irretrievable commitment of resources involved with this action. This environmental impact statement provides a sound basis for public review, decision-making, and is in compliance with the National Environmental Policy Act.

Three alternatives are addressed as follows:

Alternative 1 (Preferred) - Lease with stipulations the 2,061 acres of federal coal lands to WECo as applied for in the coal lease application.

Alternative 2 (No Action) - Reject or deny the coal lease application. The federal coal lands would not be offered for lease.

Alternative 3 (Cultural Resource Avoidance) - The coal lease application would be partially approved. Two cultural properties with values as traditional cultural properties and sites with intangible spiritual attributes would be avoided by excluding federal coal lands in and around these two sites from the coal lease application.

Under alternatives 1 and 3, the coal lease as described in the respective alternative would be offered under a competitive bid process, with the lease going to the company or individual who submits the highest qualified bid for the prospective coal lease.

Under Alternative 1 (Preferred), BLM would offer a lease sale for 2,061 acres of federal coal reserves as applied for in the coal lease application. Assuming WECo is the successful bidder for this lease, these lands which are incorporated into the company's existing mine plans would be mined accordingly. Of the 2,061 acres offered for lease, 903 acres would be mined and 1,316 would be disturbed. Approximately 745 acres would not be disturbed. WECo would be required to comply with existing approved mitigation measures which were included as part of the mine plan permits by Montana Department of State Lands and U.S. Office of Surface Mining Reclamation and Enforcement and the Special Coal Lease Stipulation (appendix 3). The additional mitigation measures include a 160-foot buffer zone to protect cultural properties and planting trees to screen the traditional cultural properties from intrusions. These will be incorporated as special stipulations to the lease.

Under Alternative 2 (No Action), BLM would deny or reject the coal lease application. The federal coal lands would not be offered for lease at this time. WECo would continue mining other federal, state, and private coal lands instead. Impacts associated with mining these federal coal lands would be avoided and shifted to the other federal, state, and private coal lands that WECo would mine. The federal coal lands in this application could and probably would be bypassed for mining.

Under Alternative 3 (Cultural Resource Avoidance), the coal lease application would be partially approved. Two cultural properties in Township 2 North, Range 40 East, section 32, which have values as traditional cultural properties and sites with intangible spiritual attributes, would be avoided by excluding 70 acres of federal coal lands in and around these two sites from the coal lease application. Since it would not be feasible to mine other areas adjacent to the 70 acres in a strip mine operation, a total of 152 acres and 6.5 million tons of recoverable coal reserves would be excluded. WECo would be required to comply with mitigation measures approved as part of the mine plan permits by Montana Department of State Lands and Special Coal Lease Stipulations (appendix 3).

ABBREVIATIONS AND ACRONYMS

ACCP	Advanced Coal Conversion Plant
AIRFRA	American Indian Religious Freedom Act
BCY	billion cubic yards
BLM	Bureau of Land Management
BTU	British thermal unit
CFR	Code of Federal Regulations
EA	environmental assessment
EIS	environmental impact statement
ft	feet
LOA	leave of absence
MBMG	Montana Bureau of Mines and Geology
mg/L	milligram per liter
mm	million
MPC	Montana Power Company
NEPA	National Environmental Policy Act
NPS	National Park Service
OB	overburden
pH	the measuring of acidity and alkalinity
TDS	total dissolved solids
U.S.	United States
USDI	United States Department of the Interior
WECo	Western Energy Company

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Chapter 1

PURPOSE AND NEED

CHAPTER 1
PURPOSE AND NEED

INTRODUCTION

On January 29, 1992, Western Energy Company (WECo) filed an application for a coal lease on federal coal lands located near their existing mine. The company holds existing federal coal leases in this area and has been mining since 1968, although previous mining by the Northern Pacific Railroad actually commenced in 1924 (Montana Department of State Lands and U.S. Office of Surface Mining Reclamation and Enforcement 1983). This coal lease application was filed with the Bureau of Land Management (BLM), the administrative agency for these federal minerals.

The subject lands in this application are located in Rosebud County approximately ten miles west of Colstrip, Montana (map 1). The coal lease application is for 2,061 acres of federal coal reserves containing 35.6 million tons of recoverable reserves (map 2).

Legal descriptions are as follows:	Acres
Township 1 North, Range 40 East	
section 6, All	681
section 8, E1/2, N1/2NW1/4	400
section 14, SE1/4, S1/2SW1/4	240
Township 2 North, Range 40 East	
section 32, All	640
Township 1 North, Range 39 East	
section 2, S1/2NW1/4, N1/2NE1/4SE1/4	100
Total	2,061

Coal ownership in this area is a checkerboard ownership pattern of alternating sections owned by the federal government (administered by BLM) and Great Northern Properties. This checkerboard ownership is the result of the Northern Pacific Railroad grant of 1896.

Purpose and Need

The WECo coal lease application was initially reviewed by the BLM, Montana State Office, Mineral Regulation and Development section in Billings, Montana. It was determined the application and lands involved met the requirements of regulations governing coal leasing by application in March 1992 (43 CFR 3425).

Since these federal coal lands are within the Powder River Federal Coal Production Region, the application needed review by the Regional Coal Team, the federal and state governing body for federal coal leasing decisions and recommendations in Montana and Wyoming. Although the Regional Coal Team was decertified in January 1990, they still retain oversight of the administrative functions of their charge. The WECo coal lease application was discussed and reviewed at the June 25, 1992, Regional Coal Team meeting. The coal lease application was approved as a production maintenance tract, allowing this coal lease application to be processed using the lease-by-application method (appendix 1). To process an application using the lease-by-application process, BLM must complete a geological report on the coal quantity and quality, a fair market value report, a maximum economic recovery report, in addition to the environmental analysis of leasing the federal coal lands included in the application.

According to the Powder River Regional Coal Team Operational Guidelines for Coal Lease-by-Applications (USDI, BLM 1991b), the BLM must prepare either an environmental assessment or an environmental impact statement to address the site-specific and cumulative environmental impacts of leasing and developing the federal coal in the application area. For this application, the decision was made by management to prepare an environmental impact statement. The reasons for this decision were the following:

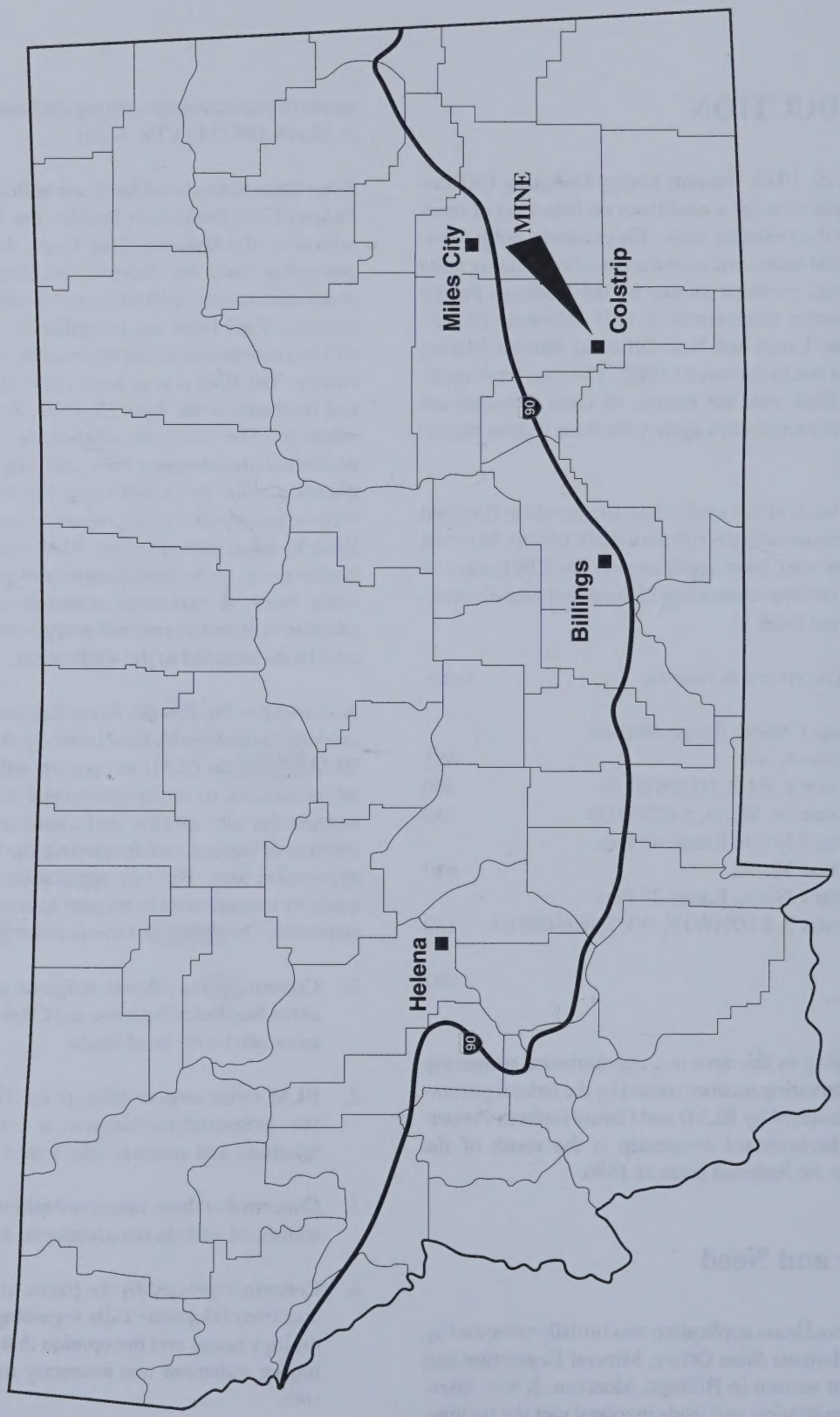
1. Concern for the cultural, religious, and spiritual values of the Northern Cheyenne and Crow Tribes that may be associated with these lands.

2. BLM's trust responsibility to the Tribes to insure that the socioeconomic impacts, as well as, the cultural, religious, and spiritual values are fully addressed.

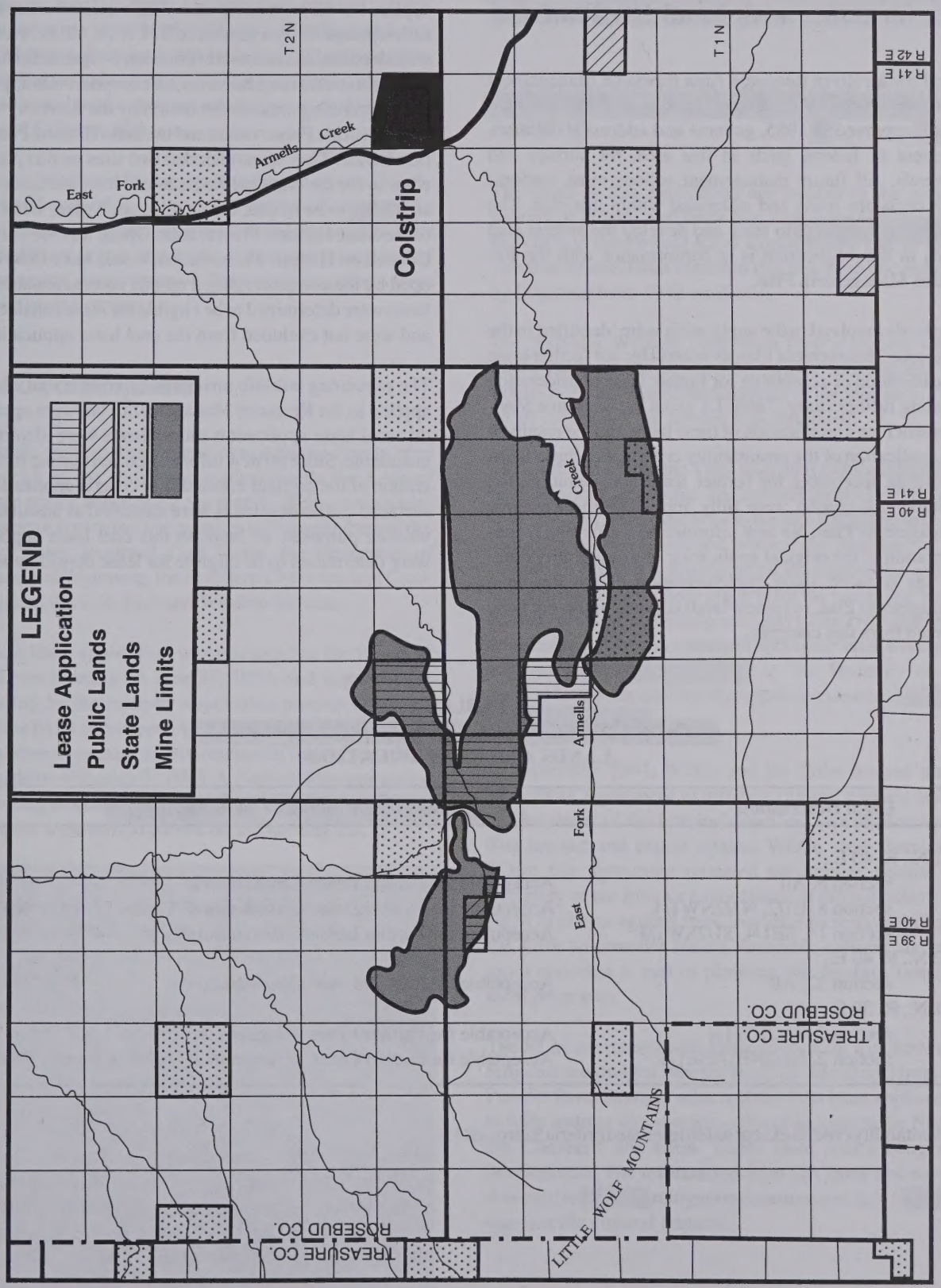
3. Concern that these values and others could not be fully addressed with an environmental assessment.

4. Concern expressed by the public at scoping meetings and from telephone calls regarding cultural and hydrology issues and the opinion that an environmental impact statement was necessary to address these issues.

MAP 1
General Location Colstrip Mine



MAP 2
Coal Lease Application Lands



5. The amount of work, scope, and effort needed to document the environmental analysis process.

Conformance with Land Use Plan

The Powder River Resource Area Resource Management Plan (hereinafter referred to as the Resource Management Plan), approved in 1985, governs and addresses the management of federal lands in this area, for surface and minerals. All future management actions must conform with decisions made and addressed within this plan. The Preferred alternative to lease and develop the federal coal lands in this application is in conformance with the Resource Management Plan.

The lands involved in the application were identified in the Resource Management Plan as acceptable for further lease consideration or acceptable for further lease consideration pending further study. Table 1.1 gives the Resource Management Plan classification of these lands and the results of the application of the unsuitability criteria. For those lands shown as acceptable for further lease consideration, the unsuitability criteria were fully applied in the Resource Management Plan. No new information warranting reconsideration of the original application of unsuitability criteria has surfaced since implementation of the Resource Management Plan, so no new lands or portions thereof were deleted from this category.

For the lands shown as acceptable for further lease consideration pending further study, wildlife inventories were incomplete at the time the Resource Management Plan was prepared. Wildlife-related criteria 9 through 15 were not applied but the remaining nonwildlife-related criteria were fully applied. Only a portion of T. 1 N., R. 40 E., section 8, was identified as unsuitable (criterion 7-significant historic and prehistoric sites); however, an exception was applied to the site pending a recommendation by the Advisory Council on Historic Preservation and the State Historic Preservation Office. They recommended two sites on this parcel as eligible for the National Register of Historic Places. If the area were to be mined, then a mitigation plan, satisfactory to the State Historic Preservation Office and the Advisory Council on Historic Preservation, would have to be developed by the company. Based on this recommendation, the lands were determined to be eligible for lease consideration and were not excluded from the coal lease application.

The remaining wildlife unsuitability criteria that were not applied in the Resource Management Plan were applied in this coal lease application and no lands were identified as unsuitable. Since no new information warranting reconsideration of the original unsuitability criteria application has surfaced and no new lands were identified as unsuitable for wildlife purposes, all lands in this coal lease application were determined to be eligible for lease consideration.

TABLE 1.1
POWDER RIVER RESOURCE MANAGEMENT PLAN
LANDS AND CLASSIFICATION

Legal Description	Results of Unsuitability Criteria Applied
T. 1 N., R. 40 E.,	
section 6, All	Acceptable for Further Lease Consideration[1]
section 8, E1/2, N1/2NW1/4	Acceptable for Further Lease Consideration (Pending Further Study)
section 14, SE1/4, S1/2SW1/4	Acceptable for Further Lease Consideration[1]
T. 2 N., R. 40 E.,	
section 32, All	Acceptable for Further Lease Consideration[1]
T. 1 N., R. 39 E.,	
section 2, S1/2NW1/4	Acceptable for Further Lease Consideration[1]
section 2, N1/2NE1/4SE1/4	Acceptable for Further Lease Consideration (Pending Further Study)

[1]Unsuitability criteria except wildlife-related criteria 9 through 15.

Scoping Issues and Concerns

Public scoping to determine issues and concerns commenced on June 11, 1992, and ended on August 1, 1992. Public meetings were held in Colstrip, Hardin, and Lame Deer, Montana. Because of the lack of public participation, the scoping period was extended through August 28, 1992, and additional public scoping meetings were held in Lame Deer and Colstrip, Montana.

Concerns expressed by the public centered on social, economic, and cultural impacts to the Northern Cheyenne and Crow Tribes; the hydrology impacts; and the need to do an environmental impact statement as the appropriate level of environmental documentation. No written comments were received on the project.

Public Participation

The public participation process was initiated shortly after the receipt of the coal lease application by the *Federal Register* notice announcing the receipt of the application. Copies were sent to members and ex officio members of the Powder River Regional Coal Team, the Governors of Montana and Wyoming, the Northern Cheyenne and Crow Tribes, and the U.S. Fish and Wildlife Service.

The coal lease application was discussed at the Regional Coal Team meeting on June 25, 1992, and approved for processing by the lease-by-application process which allowed the BLM to proceed. After the public scoping period, the decision to prepare an environmental impact statement was made on February 3, 1993. A *Federal Register* notice announcing this intent was published on February 19, 1993, and copies were sent to parties on the mailing list.

A *Federal Register* notice was prepared to announce the availability of the draft environmental impact statement, and to invite public comment on the environmental analysis and the Maximum Economic Recovery and Fair Market Value of the coal. Public meetings were held and parties on the mailing list were sent copies of the draft environmental impact statement. There was an official 60-day comment period and all oral and written comments are addressed in this final environmental impact statement.

The Environmental Protection Agency filed a Notice of Availability of the final environmental impact statement in the *Federal Register*, allowing a 30-day availability period for public comment. Comments received on this final environmental impact statement, as well as those received on the draft, will be considered in the preparation of the Record of Decision.

The Environmental Protection Agency will file a Notice of Availability of the Record of Decision. Copies of the Record of Decision will be mailed to parties on the mailing list and other interested parties. The public will be given an opportunity to appeal this decision.

Relationship to Powder River Round I Leasing

The lands in this application are located in the general vicinity of federal coal lands that were leased by the BLM to WECo in the Powder River Round I lease sale in 1982. The federal coal lands leased in this sale were encumbered by litigation from 1982 until 1991.

The National Wildlife Federation filed a lawsuit which raised issues on five counts of various deficiencies. The Courts ruled in favor of the Secretary of the Interior in 1987 on all counts and the lawsuit was dismissed.

The Northern Cheyenne Tribe also filed a lawsuit claiming possible social, economic, and cultural impacts to the Tribe were not fully addressed prior to the sale. In 1986, the Court cancelled several leases and ordered the Secretary of the Interior to prepare a supplemental environmental impact statement to address these impacts for the remaining leases because of BLM's trust responsibility to the Tribe. After the environmental impact statement was completed, a decision was made in September 1991 by the Secretary of the Interior to require additional mitigation measures on existing Round I leases.

In September 1991, WECo and the Tribe entered into a Settlement Agreement to mitigate cultural impacts before the Secretary of the Interior's decision was implemented. The lawsuit and claims against WECo were dismissed. While this agreement rendered the lawsuit against the Secretary of the Interior a moot issue, it did not relieve the BLM of claims against them, nor its trust responsibility to the Tribe to consider Native American cultural and religious concerns as part of planning and resource management programs.

The BLM contracted with Ethnoscience for a cultural and religious use study of selected tracts of federal coal from the Powder River Round I sales and this coal lease application to fully address site-specific cultural impacts to the Northern Cheyenne and Crow Tribes from coal leasing and development. The information from this study and survey was used to develop mitigation measures needed to address site-specific cultural impacts.

Relationship to BLM Policies, Plans, and Regulations

The following authorities are used to process and evaluate coal lease applications: Mineral Leasing Act of 1920, as amended; Multiple-Use Sustained Yield Act of 1960; the National Environmental Policy Act of 1969; Federal Coal Leasing Amendments Act of 1976; the Federal Land Policy and Management Act of 1976; and the Surface Mining Control and Reclamation Act of 1977. These acts and policies provide BLM the authority to manage and administer public lands including the federal coal lands in this application. Additional guidance and regulations are set forth in the 40 CFR 1500 regulations (Protection of Environment), 43 CFR 1601 (Planning, Programming, Budgeting), and 43 CFR 3400 (Coal Management).

Specific guidance for processing this application follows BLM Manual 3420 (Competitive Coal Leasing) and the 1991 Powder River Regional Coal Team Operational Guidelines For Coal Lease-By-Applications. The National Environmental Policy Act Handbook (USDI, BLM 1988a) will be followed to address the environmental impact statement process. The Resource Management Plan addressed coal planning and management of coal resources for the lands included in this lease application.

Decision Factors and Process

ENVIRONMENTAL IMPACT STATEMENT PROCESS

"All internally or externally proposed actions on or affecting public lands or resources under BLM jurisdiction must be reviewed for National Environmental Policy Act (NEPA) compliance. The first step in the NEPA process is to screen the Proposed Action in order to determine the appropriate response for ensuring NEPA compliance" (USDI, BLM 1988a). In this case, BLM made a determination that an environmental impact statement would be required to make a decision on the proposed lease application. All significant environmental and socioeconomic impacts, both beneficial and adverse, will be analyzed to enable management to make the best possible decision on the proposed lease (USDI, BLM 1991b).

There are six basic steps in the environmental impact statement process: (1) scoping the environmental impact statement; (2) conducting the analysis and preparing the draft environmental impact statement; (3) issuing the draft environmental impact statement; (4) analyzing the comments and preparing the final environmental impact statement; (5) issuing the final environmental impact statement; and (6) reaching and recording the decision. In addition to the environmental impact statement, there are other factors that are considered and play a major role in determining the decision on the proposed lease (USDI, BLM 1988a).

REGIONAL COAL TEAM CONSULTATION

The Regional Coal Team also "serves as the forum for the Department - State consultation and cooperation in all other major Department coal management program decisions in the region, including preference right lease applications, public-body and small business set-aside leasing, emergency leasing, lease transfers and readjustments and exchanges" (USDI, BLM 1988b). Their involvement and consultation is a necessary part of the proposed lease.

The Regional Coal Team met in Sheridan, Wyoming, on October 31, 1989, and recommended that the Powder River Coal Production Region be decertified. This recommendation was approved by the BLM Director on January 9, 1990. Applications to lease federal coal can now be accepted by the BLM in the region. WECo filed this coal lease application on January 29, 1992.

The WECo coal lease application was reviewed and discussed at the June 25, 1992, Regional Coal Team meeting in Gillette, Wyoming. The Regional Coal Team determined that the lands in the application met the qualifications as a production maintenance tract and approved the application for processing by the lease-by-application method. The Regional Coal Team will be kept updated on the progress of the WECo coal lease application at future Regional Coal Team meetings, through *Federal Register* notices and press releases, and the associated environmental documents.

GOVERNOR'S CONSULTATION

As part of the coal leasing guidelines, the State Director notifies the Governor of Montana that a lease application has been filed with the BLM. This was done in February 1992, and the former administration was kept apprised of the project status. In March 1993, this process was reinitiated because of a change in administration. The new administration was sent copies of all previous *Federal Register* notices, as well as an invitation to the Montana Department of State Lands to participate in the environmental impact statement as a cooperating agency. The Governor's comments and input on the application and environmental analysis process will be considered as a part of the decision-making process.

ATTORNEY GENERAL CONSULTATION

After a coal lease sale, but prior to issuance of a lease, the BLM will seek the advice of the Attorney General on whether the proposed lease issuance creates a situation inconsistent with the federal antitrust laws. The Attorney General is given 30 days to review the information on the proposed lease issuance and the successful bidder's coal holdings to make this determination. If the Attorney General has not responded in writing within 30 days, the BLM can proceed with issuance of the lease.

OTHER CONSULTATIONS

Copies of all *Federal Register* notices have been sent to the Northern Cheyenne and Crow Tribes. American Indian Religious Freedom Act consultation was also initiated with the Northern Cheyenne and the Crow Tribes, the Assiniboine and Sioux Tribe, and four Tribes within the Sioux Tribe. The BLM completed a formal cultural and religious study of the area to determine cultural impacts to the Northern Cheyenne and Crow Tribes. Cultural concerns were expressed by the Northern Cheyenne Tribe on the lands involved.

Because lease by application is considered a federal undertaking, the Section 106 process has been initiated with the Montana State Historic Preservation office.

The U.S. Fish and Wildlife Service has been kept apprised of the project by notices and letters. Formal consultation (Section 7c of the Endangered Species Act) was initiated in March 1993. There were no threatened or endangered plant or animal species affected by the proposed action.

Because they were involved in the original application of wildlife unsuitability criteria during the Resource Management Plan, the U.S. Fish and Wildlife Service and the Montana Department of Fish, Wildlife, and Parks have been consulted on the unsuitability criteria determinations for the original application and the remaining wildlife unsuitability criteria application. No lands were found unsuitable for mining. Both agencies concurred with the BLM's findings and determinations.

DECISION PROCESS

Thirty days after the final environmental impact statement notice of availability is published in the *Federal Register* by the Environmental Protection Agency, the BLM can make a decision on the coal lease application.

Comments on the final environmental impact statement will be reviewed; if no changes are needed and final consultations are satisfactory, a decision is made and documented as a record of decision. Should the decision be made to hold a competitive lease sale in response to lease application, the lease sale will follow the procedures set forth in 43 CFR 3422 and the BLM Manual Handbook H-3420-1 on Competitive Coal Leasing. The public is afforded the right to protest the decision for a 30-day period. If the decision is made to reject the application, the company is afforded a 30-day appeal period.

Authorizing Actions Needed

The BLM has the primary responsibility for the administration and leasing of the federal coal lands in this application, although other agencies have been involved. Major federal, state, and county actions are listed in appendix 2.

The BLM is responsible for the preparation of the environmental impact statement. The Montana Department of State Lands and the U.S. Office of Surface Mining Reclamation and Enforcement are involved as cooperating agencies. As the state and federal regulatory agencies, respectively, for coal mining in Montana, both agencies have been or will be involved in the issuance of the mine plan permit for these lands.

The lands in the application have been included in mine plan permits. The lands also have been addressed in previous environmental documents prepared by the Montana Department of State Lands and the U.S. Office of Surface Mining Reclamation and Enforcement as follows:

T. 1 N., R. 40 E., section 8; Final Comprehensive Environmental Impact Statement (1983)
section 14 (portion); Final Comprehensive Environmental Impact Statement (1983)

T. 1 N., R. 39 E., section 2; Environmental Assessment Area C Amendment Application (1988)

T. 1 N., R. 40 E., section 6; Environmental Assessment Area C Amendment Application (1988)

T. 2 N., R. 40 E., section 32; Environmental Assessment Area C Amendment Application (1988)

T. 1 N., R. 40 E., section 14 (portion); Environmental Assessment Area B Extension Application (1986)

Because these documents evaluated many of the issues and resource concerns associated with the mining of these lands, they are incorporated by reference into this environmental impact statement. This "tiering" to these documents avoids unnecessary paperwork and allows the BLM to concentrate its efforts on those issues that need further analysis to make a decision. Pertinent portions of these documents are briefly summarized here and only those issues that need further analysis are fully described in this environmental impact statement. The referenced documents are on file and are available for public review at the BLM offices in Miles City and Billings, Montana, and the Montana Department of State Lands offices in Billings and Helena, Montana.

Chapter 2

ALTERNATIVES

CHAPTER 2
ALTERNATIVES

INTRODUCTION

Chapter 2 describes the Preferred alternative and two alternatives to this action. The Preferred alternative is the decision to lease the federal coal lands in the application with stipulations. The No Action alternative would be to reject the application and not to allow coal mining on the federal coal lands in the application. The Cultural Resource Avoidance alternative would protect two cultural sites by removing those lands from further leasing consideration. Several other alternatives were considered but were dismissed.

Coal Land Use Screens

Coal land use planning involves four planning screens to determine whether the coal is acceptable for further lease consideration. The four coal screens are as follows:

1. development potential of the coal lands
2. surface owner consultation
3. unsuitability criteria application
4. multiple land-use decisions that eliminate federal coal deposits

In the Resource Management Plan, only in-place coal with beds 5 feet thick or greater with a stripping ratio of 15:1 or less and 500 feet of overburden or less were addressed and carried forward. The lands in this coal lease application passed this test and were addressed in the Resource Management Plan.

Unsuitability criteria application was discussed earlier in the "Conformance with Land Use Plan" section in chapter 1. All federal coal lands were determined to be acceptable for further lease consideration.

Surface owner consultation was completed as part of the Resource Management Plan. This process provided private surface owners over federal coal the opportunity to have their views considered by the BLM in land use planning. WECo also provided surface owner consent information as part of the coal lease application process.

The Resource Management Plan includes a multiple land use conflict analysis to identify and eliminate additional coal deposits from further consideration for leasing to protect resources values of a locally important or unique nature not included in the unsuitability criteria in accordance with 43 CFR 3420.1-4e(3).

In summary, all the lands in the coal lease application have been subjected to the four coal planning screens and determined acceptable for further lease consideration.

Preferred Alternative

Under the Preferred alternative, all the federal coal lands in the application offered for competitive lease as applied for are subject to the standard and special coal lease stipulations for Montana. The special coal stipulations required are shown in appendixes 3 and 4. Additional mitigation measures taken will be a 160-foot buffer zone to protect cultural properties and trees planted to screen the cultural properties from intrusions.

There are 35.1 million tons of recoverable coal reserves within the five tracts of lands (2,061 acres). If WECo acquires the federal coal lease for these lands, the coal would be mined as part of their existing operation. As part of the mining operation, approximately 903 acres would be mined and 1,316 acres would be disturbed. Approximately 745 acres would not be disturbed. The company's application explains the plan of development, annual production, and support facilities needed to mine the coal (appendix 5).

All the lands in the application are included in existing state and federal permits issued by the Montana Department of State Lands and the U.S. Office of Surface Mining Reclamation and Enforcement, respectively. The potential lease tracts are within Area C, except T. 1 N., R. 40 E., section 14, which is part of the Area B Extension (map 2).

The coal produced from Area C is dedicated to the electrical production at Colstrip generating units 3 and 4. Although coal from Area B has historically been used to fulfill coal contracts to Midwest utilities, Area B has been inactive for two years and the company plans to incorporate the lands from Area B Extension into Area C South and to use this coal for units 3 and 4.

No Action Alternative

Under the No Action alternative, the coal lease application would be denied. The federal coal lands would not be offered for lease at this time. Denial of the application is not a denial of coal mining in the area by WECo as other coal lands would be mined. Federal coal lands in existing leases and combinations of state and private coal lands would be mined instead. Approximately 903 acres of other lands would be mined and approximately 1,300 acres would be disturbed under this alternative. Appendix 6 shows the company's plan of development and operation should this coal lease application be denied.

This alternative would result in the elimination of some impacts to resources associated with mining of these federal coal lands. Cultural resource impacts would be avoided. This federal coal would likely be bypassed for mining. The coal could become economically unrecoverable in the future and, for all practical purposes, the economic value and benefits of the coal would never be realized.

Cultural Resource Avoidance Alternative

Under this alternative, a portion of the coal lease application would be approved. Two cultural properties in T. 2 N., R. 40 E., section 32, which have values as traditional cultural properties and sites with intangible spiritual attributes, would be avoided by excluding federal coal lands around these two sites from the coal lease application.

The Lovelace Memorial site (24RB301) would be avoided by excluding 40 acres and the Petro City site (24RB302) would be avoided by excluding 30 acres. Although 70 acres would be excluded from the coal lease application, additional federal coal lands would be excluded. It would not be feasible to mine these areas by a strip mine operation. This totals 152 acres containing 6.5 million tons of recoverable federal coal.

Of the remaining lands in the coal lease application (1,971 acres), approximately 740 acres would be mined and 1,075 acres would be disturbed. Approximately 896 acres would not be disturbed. Only 29.1 million tons of federal coal would be recovered; 6.5 million tons of federal coal would be left in-place in and around the two cultural properties and bypassed for mining. The bypassed coal would become economically unrecoverable in the future and the economic value and benefits of this coal would never be realized. The economic value and benefits for the 29.1 million tons of coal mined would accrue to the public as discussed in the Preferred alternative and appendix 6.

Alternatives Considered But Not Analyzed

There were several other alternatives considered during the scoping and environmental analysis process but dismissed because they were considered unreasonable or impractical. These alternatives, together with the rationale for dismissal, are discussed below.

Postponement of the coal lease sale to an unspecified later date is one alternative that was considered. Although postponement of the lease sale could result in higher coal prices in the future, assuming more utility companies will want low-sulfur coal to meet the demands of the Clean Air Act, it could also result in the bypass of this federal coal. Because of the checkerboard ownership of the coal, some coordination and cooperation among all parties is necessary for a successful coal mining operation in this area. If BLM decides to postpone the lease sale, WECo would continue mining and would bypass the coal.

Coal prices are indicative of current market conditions. Higher coal prices, even 10 to 20 years from now, will still be indicative of market conditions at that time. Since most of the revenue that accrues to the federal government is royalty payments (12.5 percent of the price of coal when sold), postponement of a lease sale is impractical. A postponement could result in a bypass of this federal coal and is not in the public's best interest.

A proposed coal lease sale for a new mine is an alternative that is impractical and unreasonable. Any coal lease sale that originates as a lease-by-application from a company is a competitive leasing process. It is possible that another company other than WECo could acquire the lease. In reality, it is highly doubtful this will happen for these reasons: the (1) checkerboard ownership pattern; (2) high cost of starting a new mine; (3) amount of coal reserves in these federal coal lands are not sufficient to justify opening a new mine or sufficient for a coal company to supply a long-term contract to a customer; (4) additional federal coal reserves would be required for a lease for a new mine to have demonstrable reserves for long-term contracts; and (5) several parcels of these federal coal lands approach the upper limits of economic feasibility for mining because of the high overburden-stripping ratio. Promoting a proposed lease sale of these federal coal lands as sufficient for a new stand-alone mine is only misleading the public and is dismissed accordingly.

An exchange of the federal coal lands is another alternative. While an exchange could prove feasible, it does not resolve anything. The resource-oriented and socioeconomic impacts would still occur as the lands would be mined after an exchange.

Another factor is the value of the coal. The closer the coal is to the dragline and to being mined, the more value it has in terms of dollars. In essence, coal that will not be mined for 20 to 30 years does not have the same value in terms of real dollars as the next trainload of coal shipped to the customer. Part of BLM's responsibility as the mineral leasing agency is to generate revenues for the state and federal government; therefore, this alternative was dismissed.

Comparison of Alternatives

A comparison of the alternatives is shown in table 2.1.

TABLE 2.1
COMPARISON OF ALTERNATIVES

Resource	Alternative 1 Preferred Alternative	Alternative 2 No Action	Alternative 3 Cultural Resource Avoidance
Climate and Air Quality	Minor impacts from continued mining.	Same as Alternative 1.	Same as Alternative 1.
Visual Resources	Minimal impacts from continued mining.	Same as Alternative 1.	Same as Alternative 1.
Noise	Minimal impacts from continued mining.	Same as Alternative 1.	Same as Alternative 1.
Geology and Topography	Moderate impacts from disturbance of soils above coal, 35.1 million tons of coal removed.	Same as Alternative 1, except impacts are shifted to other lands.	Same as Alternative 1, except only 29.1 million tons of coal removed.
Other Minerals	No development during mining.	Same as Alternative 1.	Same as Alternative 1.
Soils	Moderate impacts from impacts. Mixing of horizons, changes in physical, biological and chemical properties. 1,316 acres disturbed.	Same as Alternative 1, except approximately 130 acres of other federal lands would be disturbed.	Same as Alternative 1, except only 1,075 acres disturbed.
Vegetation	Moderate impacts for short-term, minor impacts for long-term after reclamation.	Same as Alternative 1, except other federal, state, and private coal lands would be disturbed.	Same as Alternative 1, except fewer acres are disturbed.
Hydrology	Minor impacts.	Same as Alternative 1	Same as Alternative 1.
Groundwater	Minor impacts. Some long-term degradation of aquifer water quality.	Same as Alternative 1.	Same as Alternative 1.
Surface Water	Minor impacts. Surface runoff regulated by Montana Pollutant Discharge Elimination System.	Same as Alternative 1.	Same as Alternative 1.

TABLE 2.1 continued
COMPARISON OF ALTERNATIVES

Resource	Alternative 1 Preferred Alternative	Alternative 2 No Action	Alternative 3 Cultural Resource Avoidance
Wildlife	Minor impacts from continued mining. Loss of one great-horned owl nest, reduction of raptor, mule deer habitat, increase in antelope habitat.	Same as Alternative 1, except shifted to other lands; great-horned owl nest would remain.	Same as Alternative 1, except fewer acres would be disturbed. Great-horned owl nest would remain.
Recreation	No impacts. Same as existing resource conditions.	Same as Alternative 1.	Same as Alternative 1.
Paleontological Resources	Insignificant impacts.	Same as Alternative 1.	Same as Alternative 1.
Cultural Properties	Minor impacts. Three cultural sites would be lost. Castle Rock Post Office site would be mitigated before mining.	Same as Alternative 1, except impacts shifted to other federal, state, and private coal lands.	Same as Alternative 1.
Traditional Lifeway Values	Minor impacts. Petro City and Lovelace Memorial sites would be protected by a 160-foot buffer and screened by trees.	No impacts, two traditional cultural properties would be saved.	Minor impacts. Seventy (70) acres would not be leased.
Transportation	Minor impacts from continued mining.	Same as Alternative 1.	Same as Alternative 1.
Ownership and Land Use	No change. Slight loss of agricultural lands after reclamation.	Same as Alternative 1.	Same as Alternative 1.
Social Conditions	No impacts. See Traditional Lifeway Values.	Same as Alternative 1.	Same as Alternative 1.
Economic Conditions	Minor impacts from continued mining.	Same as Alternative 1.	Same as Alternative 1.

Chapter 3

AFFECTED ENVIRONMENT

CHAPTER 3
AFFECTED ENVIRONMENT

INTRODUCTION

The lands described in this section are federal coal lands that were applied for by WECo. Legal descriptions are shown under the "Introduction" in chapter 1. As discussed under "Authorizing Actions Needed" in chapter 1, previous environmental documents by the Montana Department of State Lands and the U.S. Office of Surface Mining Reclamation and Enforcement addressed the environmental concerns associated with these lands. These documents are incorporated or "tiered" to by this document. A more in-depth analysis was done by the Montana Department of State Lands and the U.S. Office of Surface Mining Reclamation and Enforcement than described here. For more specific detail on any given resource the reader should refer to the following referenced environmental documents for these federal coal lands:

T. 1 N., R. 40 E., section 8, Final Comprehensive Environmental Impact Statement (1983)
section 14 (portion); Final Comprehensive Environmental Impact Statement (1983)
T. 1 N., R. 39 E., section 2, Environmental Assessment Area C Amendment Application (1988)
T. 1 N., R. 40 E., section 6, Environmental Assessment Area C Amendment Application (1988)
T. 2 N., R. 40 E., section 32, Environmental Assessment Area C Amendment Application (1988)
T. 1 N., R. 40 E., section 14, (portion); Environmental Assessment Area B Extension Application (1986)

Analyses of the following resources were taken from the environmental documents referenced above:

Climate and Air Quality	Wildlife
Visual Resources	Paleontological Resources
Soils	Transportation
Vegetation	Hydrology

Those issues and resources that needed further analysis are fully described in this environmental impact statement.

WECo is currently operating in Area C (map 2), which incorporates most of the lands in this coal lease application, under approved mine plan permits and associated amendments issued by the Montana Department of State Lands and the U.S. Office of Surface Mining Reclamation and Enforcement, respectively. The company has approved mine plan permits and amendments for one parcel in the Area B Extension. WECo has not mined coal in this area for the past two years. The Area B Extension mine plan permits are pending. They are presently being amended and will become "Area C South" (map 2) and will be mined as part of Area C.

The mine plan permits approved these lands to be mined in accordance with the mine and reclamation plan submitted by WECo. The permits are stipulated that the company must secure a legal right (either lease, exchange, or purchase) before mining can commence on these federal coal lands. The purpose of this environmental impact statement by the BLM is to make a determination on whether these lands should be leased.

Previous studies have shown that the following resources in this area are not involved or impacted by coal mining:

Areas of Critical Environmental Concern
Floodplains
Threatened and Endangered Species
Hazardous Wastes
Wetlands/Riparian Areas
Wild and Scenic Rivers
Wilderness

Other resource values that might be impacted from mining are addressed below.

Climate and Air Quality

The Colstrip area is characterized by a semi-arid continental steppe climate with cold winters and warm summers. The mean annual temperature is 46.2 degrees Fahrenheit, with an average temperature of 71.8 degrees Fahrenheit in July (warmest month) and 20 degrees Fahrenheit in January (coldest month) (Department of State Lands and U.S. Office of Surface Mining Reclamation and Enforcement 1988a). The mean annual precipitation is 15.52 inches at the

Colstrip National Weather Service Station with about 70 percent falling during the growing season (U.S. Department of Commerce 1987). The average annual snowfall is 34.6 inches. The mean annual wind speed is about 7.5 miles per hour, predominantly from west-northwest during the cooler months and shifting to the southeast in the warmer months.

WECo monitors air quality for particulates in and around the Rosebud Mine as part of their air quality monitoring program. The company has eight sites with various types of particulate samplers that are monitored continuously (Doran 1993). The total suspended particulate data at the sites are monitored on a 24-hour six-day frequency basis. Because of the high concentrations of total suspended particulates, the air quality in the Colstrip area does not meet the Montana and National Ambient Air Quality Standards. The air pollution sources for Area C include mining and related activities, construction, agricultural activities, and vehicle traffic.

On April 26, 1986, the U.S. Environmental Protection Agency designated a 120 square-mile area as a nonattainment area for federal secondary total suspended particulates standards. This designation is based primarily on data collected in or near the town of Colstrip. The federal and state standards have been repealed and replaced with PM-10 standards (particulates less than 10 microns in diameter). The only lands in the application within the nonattainment area are those lands in T. 1 N., R. 40 E., section 14. Particulate levels in the outlying areas, such as the other lands in Areas B and C, are well below the ambient air quality standards.

Visual Resources

The lands applied for are situated in the Areas B and C where existing strip mining and associated mining activities are taking place. The majority of lands are used as part of the ranching operations and some of the lands are used for dryland wheat farming. Evidence of these uses is visible to the casual observer.

The landscape of the Colstrip area consists of gently rolling hills covered by Ponderosa pine with short-grass native prairie on the hillsides and valleys. Agricultural lands punctuate the landscape in the area.

Scenic quality is fairly low because of the industrial nature of the existing mining and was classified as class "C" because of its common physiographic and vegetative characteristics (USDI, BLM 1980). Relief is low to moderate because of the rolling nature of the hills and the colors are mostly neutral. The lands would be classified for visual resource management as Class IV, meaning that the mining activity attracts attention and is a dominant feature of the landscape to the casual observer. The lands proposed for mining are aesthetically pleasant but are not unique to Rosebud County.

The lands are located in a sparsely populated area, some 6 to 12 miles from Colstrip. There is an occupied residence in T.2 N., R. 40 E., section 32, NW1/4. WECo owns this homesite and it is outside the area to be mined (Schwarzkoph 1993; Tickner 1993). There is also a mobile home at the old Castle Rock Post Office in T. 1 N., R. 40 E., section 6.

Noise

Existing noise sources in the area are coal mining activities, natural sounds such as wind, wildlife, or livestock, ranching and farming activities, and traffic. Normal background sound levels are approximately 29 decibels at 3.8 miles from Colstrip (Montana Department of State Lands and U.S. Office of Surface Mining Reclamation and Enforcement 1983). As an individual approaches the mining activity, the noise level increases accordingly. Mining activities increase the noise level to a range of 85 to 95 decibels where

Grazing and dryland farming lands adjacent to the Montana Power Company plant

the actual mining operations and activities occur (USDI, BLM 1992b).

Geology and Topography

The Powder River Basin is an asymmetrical structural and physiographic basin that was formed by Laramide structural movements during Paleocene and Eocene times. It is within the Great Plains Physiographic Province and is almost completely surrounded by structural highlands: the Black Hills Uplift to the east; the Hartville Uplift, Laramie Mountains, and Casper Arch to the south; the Big Horn Uplift to the west; and the Miles City Arch to the north.

The basin contains over 16,000 feet of sedimentary rocks on a Precambrian crystalline core. About 11,000 feet of the rocks are Cambrian to Cretaceous pretectonic deposits that crop out discontinuously around the edges of the basin. The pretectonic deposits are composed of Paleozoic marine limestones and sandstones that are relatively uniform in composition and thickness. Above the Paleozoic rocks are continental and shallow marine shales, and claystones that range in age from Triassic to early Cretaceous. Thick upper Cretaceous marine shales plus marine and nonmarine sandstones, form the upper portion of these deposits. The remaining sediments are approximately 5,000 feet of Tertiary rocks resulting from the Laramide deformation. The freshwater sedimentary rocks of the Eocene Wasatch Formation overlie most of the basin. The Paleocene Fort Union Formation is immediately beneath the Wasatch and crops out as a band around it.

The axis of the basin is west of the basin's center and trends north-south. The Tertiary rocks surrounding the basin generally dip 2 to 3 degrees toward the center of the basin. The Cretaceous rocks dip more steeply than Tertiary rocks. Faults are relatively rare in most of the basin.

The tract area is in the northern part of the Powder River Basin and is located west of the structural axis of the basin. The topography is gently rolling hills. The East Fork of Armells Creek is the drainage for these lands. The Montana Department of State Lands has determined that the East Fork is an ephemeral stream and does not meet the qualifications for an alluvial valley floor. Most of the lands in the application are situated north of the main drainage, except the portion of T. 1 N., R. 40 E., section 14, which is south of the creek. Many of the upper reaches and tributaries which empty into the main drainage are located on these lands. Elevation ranges from 3,430 feet to 3,810 feet above sea level.

The Fort Union Formation is the surface unit within the study area. It is typically poorly consolidated and consists of light brown and gray interbedded sandstone, silty shale, carbonaceous shale, clay, and coal. The coals include the minable beds of the Rosebud seam (the subject of this study), the McKay, Stocker Creek, Robinson, and Burley beds. Clinker, rock that was baked and fused by the near-surface burning of coal, is exposed in the study area. It is found on the north edge of the tract and along East Fork Armells Creek, between Area C and the Area B Extension.

No major faults are known to occur in the tract. There is minor faulting in T. 2 N., R. 39 E., sections 34 and 35, and T. 1 N., R. 39 E., sections 2 and 3, in the westernmost end of the tract (Colorado School of Mines Research Institute 1978a, 1979b). These are north-south trending normal faults having as much as 10 feet of vertical displacement.

Two main coal beds occur in the study area. They are, from younger to older, the Rosebud and McKay. Beneath the McKay are the Stocker Creek, Robinson, and Burley beds. These last three are too thin and deep to consider minable. The coals dip generally less than one-half degree from west to east. There is a structural high near the center of the tract area with a total relief of about 160 feet. Local structural dips generally do not exceed one degree.

Following is a description of each stratigraphic unit. The low, high, and average thickness and quality values of each coal bed and interburden zone are shown in table 3.1.

The overburden is typically interbedded shale, siltstone, and sandstone. Some zones in the sandstone are well cemented and form cliffs in outcrops. The outcrop of the Rosebud is often burned, leaving deposits of baked and fused rock (commonly known as clinker or scoria). Overburden thicknesses range from 0 to 336 feet, along the northern edge of the tract to its southern side respectively.

The Rosebud is the principal coal bed of the area, and the only bed to be mined in the Rosebud Mine. The Rosebud averages 22.7 feet thick through the Area C mine plan area and 22.3 feet thick in the application parcels. In the Area B Extension mine plan, the Rosebud averages 20.4 feet thick and 23.0 feet thick in the application parcel.

The Rosebud classifies as subbituminous C coal according to the American Society for Testing and Materials, "Classification of Coals by Rank." The Rosebud averages 8,571 British thermal unit per pound in the tract (table 3.2). Interburden between the Rosebud and McKay varies from 12 to 115 feet thick. It is composed of sandstone, siltstone, shale, and minor local freshwater limestone. The McKay, below the Rosebud, averages 8.0 feet thick throughout the tract and 7.5 feet thick in the application area. The McKay also classifies as subbituminous C coal with an average heating value of 8,427 British thermal unit per pound in the

TABLE 3.1
STRATIGRAPHIC UNIT DATA

	Area C Mine Plan Area				Area B Extension Mine Plan Area				
Stratigraphic Unit	Application Area Average	Average	High	Low	Application Area Average	Average	High	Low	Number of Samples
Overburden	63.8	66.2	336.0	0.0	90.4	68.1	220.0	0.0	
Rosebud	22.3	22.7	29.5	4.0	23.0	20.4	25.0	10.0	831
Interburden	83.5	63.8	115.0	12.0	70.1	71.5	90.0	62.5	
McKay	7.5	8.0	9.5	2.0	8.5	7.8	9.0	6.0	181
Interburden		7.4	98.0	0.5					
Stocker Creek		3.7	9.5	1.5					348
Interburden		56.8	82.0	23.0					
Robinson		7.9	11.0	2.8					15
Interburden		19.8	62.0	5.0					
Burley		5.5	7.0	4.0					6

NOTE: Figures are the thickness in feet.

tract (table 3.2). Its sulfur is relatively high, averaging 1.49 percent.

Although the McKay meets the physical standards for surface mining (depth and thickness), its quality prevents mining. A long history of federal management decisions has accepted the McKay as noncommercial. On June 4, 1979, the Board of Natural Resources and Conservation of the state of Montana prohibited the use of McKay coal, alone or in combination with Rosebud coal, in the Colstrip generating facility. This was due to the high sulfur content of the McKay coal. A state written analysis and documentation of buyer responses to WECo further support the noncommercial status of the McKay coal.

TABLE 3.2
COAL QUALITY DATA
AREAS C AND B EXTENSION, AND ROSEBUD MINE

Stratigraphic Unit:	Btu/Pound			Percent Ash			Percent Sulfur			Percent Moisture		
Number of Samples	Application Area	Leased Area	Mine Plan Area	Application Area	Leased Area	Mine Plan Area	Application Area	Leased Area	Mine Plan Area	Application Area	Leased Area	Mine Plan Area
Rosebud:107												
Average	8,360	8,622	8,571	10.03	9.04	9.10	0.97	0.86	0.88	25.52	24.79	24.83
High	9,363	8,990	9,363	13.17	13.99	13.99	2.33	1.42	2.33	28.85	28.33	28.85
Low	7,854	7,936	7,854	7.88	7.92	7.40	0.65	0.61	0.53	15.28	21.55	15.28
McKay: 105												
Average	8,315	8,483	8,427	6.10	5.41	6.15	1.52	1.41	1.49	25.40	21.65	23.33
High	8,907	8,765	8,990	9.90	9.29	14.11	3.03	1.90	3.03	28.89	28.92	28.92
Low	7,708	7,812	7,708	0.82	1.61	0.82	0.49	0.54	0.49	23.31	19.10	19.10

Map 2 shows the mine plans and lease tracts in Areas C and B Extension. Table 3.3 lists the coal tonnage and overburden volumes for the mine plans.

TABLE 3.3
SUMMARY OF COAL TONNAGE AND OVERBURDEN FOR ROSEBUD BED, AREAS C AND B EXTENSION, AND ROSEBUD MINE

	Mine Plan Area (acres)	Tons Minable (millions)	Tons Recoverable (millions)	Overburden (cubic yards) (thousands)
Area C: Lease Application MTM-80697	890.6	36.090	33.925	113,001
Remainder of Mine	4,074.5	147.351	138.510	474,449
Total Area C:	4,965.1	183.441	172.435	587,450
Area B Extension: Lease Application MTM-80697	159.1	1.757	1.652	23,213
Remainder of Mine	1,866.7	53.284	50.087	199,461
Total Area B Extension:	2,025.8	55.041	51.739	222,674
Total Mine Areas:	6,990.9	238.482	224.173	810,124

Minerals

OIL AND GAS

This area is located on the gently dipping northwest flank of the Powder River Basin. The area is classified as having high occurrence potential, because of the thickness of the favorable geologic formations (USDI, BLM 1992d). This is projected to have a moderate level of drilling and activity over the next 15 years which could include drilling one to eight wells in any given township. The oil and gas mineral ownership of the subject lands is private. There is no oil and gas development in the area.

OTHER MINERALS OR MINERAL-RELATED RESOURCES

The other minerals are in private ownership. There are no valuable deposits of sand and gravel or locatable minerals known to exist on these lands (Montana Department of State Lands and U.S. Office of Surface Mining Reclamation and Enforcement 1983). Scoria deposits occur along the outcrops of the coal bed.

There are no known valuable geothermal resources that could be developed commercially. The geothermal resources are low-temperature geothermal waters commonly found in south central Montana at depths greater than 6,000 feet. There are no geothermal interests reserved to the United States.

There are no known valuable deposits of coal bed methane in the area. The coal bed methane (leased as oil and gas) is in private minerals ownership.

Soils

There are four basic groups of soils in the area: sandy residual soils, alluvium loamy and clayey soils, clinker soils, and the unbaked shale and siltstone soils. The three basic groups are primarily aridisols, mollisols, and entisols. These soils were developed in sandstones, shales, and siltstones, and alluvium derived from these materials. Most of the soils are deep and well-drained. Textures tend to be loamy but range from loamy sands to silty clays. The subsoils are predominantly weakly developed to poorly developed.

The sandy residual group usually occurs in the relatively smooth rolling topography. Typical vegetation is the mid-tall grasses with some small stands of ponderosa pine (*Pinus ponderosa*) along ridges.

The alluvium loamy and clayey soils occur in the valleys adjacent to intermittent streams and in swales between hills and ridges. Vegetation includes mid-grasses and sagebrush with some cultivation of these soils, primarily wheat farming.

The clinker soils usually occur on ridgetops and the crests of rolling hills. Vegetation tends to be predominantly stands of ponderosa pine with scattered Rocky Mountain juniper (*Juniperus scopularum*).

The unbaked shale and siltstone soils occur in complex, dissected, hilly areas. There is a wide range of vegetation types associated with these soils. They range from sparsely vegetated areas of junipers and rubber rabbitbrush (*Chrysothamnus nauseosus*) to stands of ponderosa pine.

The reclamation potential is generally favorable with slight to moderate erosion for most of these soils.

Vegetation

Nine vegetative types were delineated and will be disturbed by mining activities on these lands. Seven vegetative types are native-dominated species, with agriculture lands and disturbed areas (such as crested wheatgrass stands) comprising the other two types. No threatened or endangered plant species are known to occur on these lands or in this area. Plant species found within the area are shown in appendix 7. A brief description of the vegetative types follows.

Grasslands tend to occur on the silty and sandy range sites. The dominant grass species are green needlegrass (*Stipa viridula*), western wheatgrass (*Agropyron smithii*), and needleandthread (*Stipa comata*). Forbs included woolly plantain (*Plantago purshii*), fringed sagewort (*Artemisia frigida*), and false tarragon sagewort (*Artemisia dracunculus*).

The big sagebrush-grassland vegetative type tends to occur on fine-textured soils, such as found on side slopes. These areas are found below eroding shale and siltstone formations (Econ, Inc. 1983). The dominant shrubs are big sagebrush (*Artemisia tridentata*) and broom snakeweed (*Xanthocephalum sarothrae*); while bluebunch wheatgrass (*Agropyron spicatum*), western wheatgrass, green needlegrass and prairie june grass (*Koeleria cristata*) dominate the grasses in this community. Common forbs are Hood's phlox (*Phlox hoodii*) and western yarrow (*Achillea millefolium*).

Silver sagebrush-grassland communities are typically found on deep silty alluvial deposits (mesic conditions) or sandy and silty upland terraces. Dominant shrubs are silver sagebrush (*Artemisia cana*) and snowberry (*Symphoricarpos occidentalis*) although skunkbush sumac (*Rhus trilobata*) and prairie rose are also present. Important forbs are the yellow sweetclover (*Melilotus officinalis*), salisfy (*Tragopagon dubius*) and woolly plantain. Perennial grasses include the Western wheatgrass, Kentucky bluegrass (*Poa pratensis*), sun sedge (*Carex pensylvanica*) and needleandthread. Japanese brome, an annual invader species, is also predominant in this community.

The skunkbush sumac-grassland community commonly occurs on sandy, shallow soils, often skirting the base of pine-dominated ridges and side slopes. Skunkbush sumac, broom snakeweed, and prairie rose are the common shrubs. Although many species of forbs were found, their coverage is quite low indicating that forbs were relatively unimportant in this vegetative type. Important grasses included threadleaf sedge, sun sedge, western wheatgrass, and bluebunch wheatgrass.

The mixed shrub vegetative type is characteristic of exposed, elevated ridgetops and steep side-slopes, often over weathered and highly eroded sandstone and shale deposits. Broom snakeweed and skunkbush sumac are the most common shrubs found, although prairie rose, rubber rabbitbrush, shrubby evening primrose (*Oenthera serrulata*) and yucca are also prevalent shrubs. Primary forbs include the standing milkvetch (*Astralagus striatus*), few-flowered buckwheat (*Eriogonum pauciflorum*), Hood's phlox, and yellow sweetclover, while bluebunch wheatgrass, prairie junegrass, and western wheatgrass are the principal grass species.

Some mixed shrub communities are present on highly-weathered clay knobs. On those sites, salt-tolerant shrubs such as shadscale (*Atriplex confertifolia*) and Nuttall saltbush (*Atriplex nuttallii*) tend to dominate these sites.

The upland deciduous shrub-grassland vegetative type is often associated with upper and mid-elevation draws and drainage channels (wet or mesic conditions). The upper elevation communities are small and isolated, usually restricted to seeps and deep cuts (Econ, Inc. 1983). Dominant shrubs include snowberry, Wood's rose (*Rosa woodsii*), golden currant (*Ribes aureum*), and silver sagebrush. Western yarrow, cudweed sagewort (*Artemisia ludoviciana*), and pellitory (*Parietaria pensylvanica*) were the most important forbs. Grasses included Kentucky bluegrass, western wheatgrass, and Japanese brome.

The ponderosa pine-grassland community occupy the ridges and hillsides and is generally found on rocky, shallow-deep soils associated with sandstone or clinker outcrops. Dominant trees are ponderosa pine (*Pinus ponderosa*), and Rocky Mountain juniper (*Juniperus scopularum*). Common shrubs are skunkbush sumac, snowberry, big sagebrush, and silver sagebrush; while, yellow sweetclover, skunkbush sumac, and salisfy are the more common forbs. Grasses include bluebunch wheatgrass, needleandthread, side-oats grama (*Bouteloua curtipendula*), and sun sedge.

The disturbed grassland vegetative type is former native rangeland that has been converted to tame pastures. Typically, crested wheatgrass (*Agropyron cristatum*) has been seeded on these areas which are used for off-season grazing or cut for hay.

In the area of the lease application, there are no wetlands. Agricultural lands in the application area are primarily upland cropland used for wheat farming, both winter and spring wheat, or hay meadows of alfalfa (*Medicago sativa*) and grasses. Land use of the area is predominantly rangeland and wildlife habitat interspersed with agricultural lands needed for part of the ranching operation or wheat farming.

Hydrology

GROUNDWATER

Groundwater resources in the vicinity of the application lands include shallow aquifers in the valley fill materials of East Fork Armells Creek, West Fork Armells Creek, and Stocker Creek which are used as a livestock water source because of their shallow water table. The sub-McKay portion of the Tongue River Member of the Fort Union Formation is the most widely used aquifer in the area. The Rosebud coal seam is occasionally used as a groundwater source. Because of its low productivity the McKay coal seam is seldom used as a groundwater source. A mine spoil aquifer is developing as spoil material in reclaimed areas resaturates. In some locations this is used as a water source for livestock.

Groundwater usage in the area is predominantly for livestock water sources. Groundwater is not available in sufficient quantity or of high enough quality to be used for irrigation. Groundwater is used for domestic purposes from various aquifers but is seldom of suitable quality to be used as a source of drinking water.

Groundwater flow in the vicinity of the application lands is generally to the east. The flow in the Rosebud coal seam and McKay coal seam is north toward the cropline in the northwestern portion of the area. The flow of groundwater in the valley fill materials tends to follow the main drainage channel.

Transmissivities (the rate of movement of water through strata) for these aquifers tend to vary between locations within each aquifer. Transmissivities measured in the area range from 1 to 75,000 gallons per day per foot. Table 3.4 presents the mean transmissivity of each aquifer in the area.

TABLE 3.4
SUMMARY OF AQUIFER TEST DATA

Stratigraphic Horizon	Data Source	Lognormal Mean Transmissivity[a]	Expected Yield	Range[a]
East Fork Armells Creek Alluvium	WECo	2,804	moderate	6.4 to 74,800
East Fork Armells Creek Alluvium	MBMG	14,200	moderate	(one test)
Stocker Creek Alluvium	WECo	5,918	moderate	250 to 52,800
West Fork Armells Creek Alluvium	WECo	1,753	low	105 to 10,000
Rosebud Coal	WECo	30	very low	0.5 to 1,650
Rosebud Coal	MBMG	109	low	10 to 12,700
Interburden	WECo	28	very low	1.5 to 536
Interburden	MBMG	210	low	(one test)
McKay Coal	WECo	37	very low	1 to 1,970
McKay Coal	MBMG	53	very low	5 to 230
Sub-Mckay	WECo	134	low	25 to 1,120
Spoils	WECo	298	low	28 to 2,955
Spoils	MBMG	33	very low	1 to 480

NOTE: Montana Bureau of Mines and Geology (MBMG) and WECo transmissivities were obtained at different locations within each aquifer so some variability in results can be anticipated.

[a]gallons per day per foot

Groundwater quality in the vicinity of the application lands also varies from one location to another within each aquifer. Table 3.5 presents the mean total dissolved solids and the corresponding Montana stock water standards category for each aquifer in the Colstrip area.

TABLE 3.5
AVERAGE TOTAL DISSOLVED SOLIDS BY AQUIFER

Aquifer	Total Dissolved Solids	Montana Stock Watering Standards Category
Sub-McKay	1,960	Good
McKay Coal	1,650	Good
Rosebud Coal	2,090	Good
Rosebud Spoil	3,000	Fair
East Fork Armells Creek Valley Fill[a]	2,340	Good
West Fork Armells Creek Valley Fill[a]	3,970	Poor
Stocker Creek Valley Fill[a]	3,190	Fair

[a]Reaches adjacent to application lands

Total dissolved solids measurements represent the mineralization of the water. In most groundwater in the area, sulfate is the predominant anion. In some locations, bicarbonate is the predominant anion. The major cation is usually magnesium or calcium and occasionally sodium. The pH, nutrient concentrations, and trace metals concentrations typically fall within federal acceptable limits. Individual wells sometimes contain trace element levels in excess of Federal Drinking Water Standards or total dissolved solids levels above those recommended for livestock.

Thirteen wells lie in or near the application lands of which four lie within the disturbance area to be impacted by mining. One of the four wells is used as a reliable water source for livestock watering.

SURFACE WATER

Four drainage systems receive surface water flow from the application lands. The northwestern portion of these lands lie in the drainages at the head of West Fork Armells Creek. The central and northeastern portion of the lands lie within the upper portion of the Stocker Creek drainage. The remaining lands to the southeast are in the East Fork Armells Creek drainage and Lee Coulee. Table 3.6 shows the area of each drainage and the amount of application lands in each drainage.

TABLE 3.6
DRAINAGE SYSTEMS AND AREAS INVOLVED

Drainage	Total of Drainage Area[a]	Area of Application Lands[a]
East Fork Armells Creek[b]	156	0.45
West Fork Armells Creek	148	0.67
Stocker Creek	26	1.80
Lee Coulee	21	0.30

[a] square miles
[b] above confluence of the West Fork Armells Creek

Surface water resources in the vicinity of the application lands consist of surface water runoff from major rainfall or snowmelt events and springs where groundwater discharges into low points in the drainages. These resources are mainly used as a water source for livestock and wildlife. Some of the surface water runoff is captured in private stock water ponds. The length of time these ponds contain water is dependent upon the drainage area above the pond as well as how individual ponds are constructed. Most stock water ponds in the area do not contain water during portions of drier years.

Surface water flow in the upper reaches of ephemeral drainages in the application lands is mainly a result of major snowmelt or rainfall events. Two springs in section 32 lie within the application lands with enough flow to be used as a livestock and wildlife water source. The flow from these springs is not of sufficient quantity to result in perennial flow within an extended reach of the channel downstream of the spring.

Runoff from rainfall or snowmelt events is usually for a short duration and of high quality. The total dissolved solids of the water from a significant runoff is about 200 milligrams per liter. This is the highest quality water available in the area.

Total dissolved solids concentrations of base flow in the Stocker Creek and the East Fork Armells Creek drainages is typically between 3,000 and 4,000 milligrams per liter, however total dissolved solids concentrations in excess of 10,000 milligrams per liter have been measured. The higher total dissolved solids values occur in ponded areas at the end of the summer months when concentration of dissolved

solids by evaporation is at its peak. High quality runoff from rainfall events is also absent during this time. Surface water flow in the upper portion of the West Fork Armells Creek drainage is primarily high quality snowmelt of rainfall runoff. This results in lower total dissolved concentrations than in the East Fork Armells Creek or the Stocker Creek where base flow is present.

Wildlife

Wildlife investigations in the Colstrip area began in 1973 and have continued since then. The initial wildlife baseline study was done by Econ, Inc., on a 10x20 square mile area in 1973. The study area has been altered since then to conform to the present 91 square mile study area which is monitored by WECo. Most of the federal coal lands were inventoried in the original wildlife baseline inventory by Econ, Inc. The remaining lands were inventoried as part of the Area C inventory completed in 1983 by WECo.

The most common big game species are pronghorn antelope (*Antilocapra americana*) and mule deer (*Odocoileus hemionus*). The antelope are usually found in the grassland and shrub-like-grassland vegetative types. The mule deer uses all habitats, although they show a marked preference for the ponderosa pine-grassland and shrub-like-grassland vegetative types. There is extensive use of the reclamation areas east of the application area by mule deer in all seasons. In fact, WECo has initiated and held limited antlerless deer hunts on these areas to help control the population and ongoing damage to reclamation by mule deer. WECo also initiated a special mule deer study in 1991 as part of their wildlife inventory efforts. There is no big game winter range for antelope or mule deer identified on these lands.

Even though white-tailed deer (*Odocoileus virginanus*) and elk (*Cervus canadensis*) have been occasionally seen in the area, these species are not really considered resident species. There is a small elk herd (10 to 20 individuals) established in the Little Wolf Mountains, 6 to 10 miles distant from the coal lands involved in the application. Only a few observations of either species have been made over the years, probably by individuals wandering through the area.

Other mammals include predators, such as the coyote (*Canis latrans*), red fox (*Vulpes vulpes*), and bobcat (*Lynx rufus*), bats, shrews, rabbits, and rodents. A complete listing of mammals that have been observed or recorded in the area is shown in appendix 8.

The sharp-tailed grouse is the most common game bird in the area. WECo has monitored sharp-tailed grouse dancing grounds or arenas since 1973. They have found that some arenas have been abandoned over time and new arenas have been established. WECo has been quite successful in the relocation of arenas into reclamation areas (Waage 1989, 1992). Two inactive sharp-tailed grouse arenas were located on the federal coal lands in this application. One small arena (six males in attendance) was located in T. 1 N., R. 40 E., section 6; it was only active in 1986 and has not been used since then (Waage 1993). The other arena in T. 2 N., R. 40 E., section 32, was active from 1975 to 1985 and was originally designated as unsuitable for mining (criterion 15).

WECo developed a mitigation plan satisfactory to the Montana Department of Fish, Wildlife, and Parks and Montana Department of State Lands. BLM removed the "unsuitable for mining" designation for these lands based on a satisfactory agreement by all parties. In 1986, the sharp-tailed grouse population hit a 20-year low in this area and the arena was abandoned and has not been used since (Waage 1993). The 1991 lek density index population (estimated 6.6 grouse per square mile) is the second highest population estimate in 19 years (WECo 1992). This indicates that the sharp-tailed grouse are doing well in the area. No sage grouse have been observed on any of these lands in recent years.

Ring-necked pheasant habitat and distribution is primarily limited to the riparian areas along the East Fork of the Armells Creek. Overall, the area is marginal habitat for ring-necked pheasants. None of the ring-necked pheasant habitat, as shown in the WECo annual report (1992), is involved with lands in this application.

Although gray partridge (*Perdix perdix*) are occasionally seen in the area, the populations are quite low. This species usually prefer agriculture lands.

In 1991, nine observations of 54 Merriam's turkey (*Meleagris gallopavo*) were made; most of these observations were in the ponderosa pine-grassland or reclamation east of the lands involved in the application (WECo 1992).

Waterfowl seen and recorded in the area are shown in appendix 8. Most observations were made on Castle Rock Reservoir, East Fork Armells Creek, or impoundments on the area. There are no large reservoirs or impoundments or other suitable waterfowl habitat on the lands involved; only one small stock pond exists in T. 1 N., R. 40 E., section 8.

Raptors seen and recorded in the area are shown in appendix 8. The only active raptor nest on any of these lands is a great-horned owl (*Bubo virginianus*) nest in a sandstone outcrop in T. 2 N., R. 40 E., section 32 (Waage 1993).

Bald eagles (*Haliaeetus leucocephalus*) and peregrine falcons (*Falco peregrinus*), threatened and endangered species, have been observed in the area. There are no known nests of either species and the sightings are considered those of transient or migrant individuals.

Other bird species seen and recorded in the area are shown in appendix 8.

Reptiles, amphibians, and fish observed in the area are shown in appendix 8.

Recreation

There are no developed recreational facilities on the lands involved. Any recreational use consists of dispersed recreation such as hunting for big game or game birds, horseback riding, or hiking. There is an outfitter who leases one of the ranches and hunts on some of the lands in this area (Waage 1993). WECo has also initiated a limited deer hunt, involving some of the lands in and around the mining areas, to harvest and control the deer herd. These hunts are restricted to antlerless deer and are tightly controlled for safety reasons. All the lands applied for are privately-owned surface and federal coal so access for recreational purposes is controlled by the private surface owner. Permission must be granted before these lands can be utilized for recreation.

Paleontological Resources

Plant and invertebrate fossils of the Paleocene Period are abundant throughout the Fort Union Formation and are likely to be found on the lands involved. These are common fossils with limited scientific value or significance. No significant vertebrate fossils are known to occur in the Fort Union Formation (Taylor 1975; U.S. Geological Survey and Montana Department of State Lands 1979).

Cultural Resources

CULTURAL PROPERTIES

Cultural resource surveys in 1973, 1980, 1982, and 1986 resulted in all of the 2,061 acres of the proposed lease having been inventoried at the Class III level of intensity. Seven cultural resource sites have been identified by these surveys. Four sites have been found not eligible for the National Register, while two sites have been determined eligible, and one site is considered potentially eligible through consultation with the State Historic Preservation Office.

Class III inventories conducted in WECo's mining Areas B and C include portions of the following proposed lease tracts:

T. 1 N., R. 39 E., P.M.M., section 2, S1/2NW1/4 (80 acres), N1/2NE1/4SE1/4 (20 acres)

These two parcels and surrounding area were surveyed in 1978 and 1979 (Fredlund 1980). No sites were located on these two parcels in section 2.

T. 1 N., R. 40 E., P.M.M., section 6, lots 1, 2, 3, and 4, S1/2N1/2, S1/2 (All) (681 acres)

This parcel was surveyed in 1978 and 1979 (Fredlund 1980). Two cultural resource sites were located in section 6.

The Rabbit Ridge site (24RB310) is located among remnant sandstone outcrops on a hilltop. The site consists of a prehistoric surface lithic scatter of unknown affiliation. The other site is the historic Castle Rock Post Office (24RB335). The Rabbit Ridge site was determined not eligible for the National Register, while the Castle Rock Post Office site was determined eligible for the National Register. WECo and the Montana Department of State Lands are consulting with the Montana State Historic Preservation Office concerning appropriate mitigation and the development of a mitigation plan for the Castle Rock Post Office site.

T. 1 N., R. 40 E., P.M.M., section 8, E1/2, N1/2NW1/4 (400 acres)

This parcel was originally surveyed by Fredlund and Fredlund (1973). One cultural resource site was located by

this inventory on the lease tract. This site is a historic homestead era log cabin site, the Rasmus Sweik Homestead (24RB1066), and was determined eligible for the National Register. A more intensive examination and testing program was conducted for this site in 1983 by Cultural Research and Management, Inc. of Bismarck, North Dakota. Since then, this site has been destroyed by the surface owner.

In 1983, a subsequent cultural inventory was conducted in section 17 (Fredlund 1986). This inventory identified the Deadly Draw cultural site (24RB975) that extended from section 17 into section 8. This site consists of surface and buried deposits of a Late Plains Archaic or Late Prehistoric period lithic scatter along the floodplain and side slopes of the East Fork of Armells Creek. This site also contains an historic component, the remains of a log structure. The Deadly Draw site was determined potentially eligible for the National Register, pending additional testing.

T. 1 N., R. 40 E., P.M.M., section 14, S1/2SW1/4, SE1/4 (240 acres)

This parcel was surveyed in 1981 (Steere 1982). The Normand Estates site (24RB883) was located by this inventory. This site consists of a surface lithic scatter located on a ridge top. The Normand Estates site is a Late Prehistoric short-term hunting camp occupation and was determined not eligible for the National Register.

T. 2 N., R. 40 E., P.M.M., section 32, All (640 acres)

This parcel was surveyed in 1978 and 1979 (Fredlund 1980). Two cultural resource sites were found in section 32. The Lovelace Memorial site (24RB301) is a petroglyph site located on a sandstone remnant protruding from the crest of a ridge. The site consists of mostly historic rock carvings of initials and names of local people and one small panel of late prehistoric rock art around the base of the sandstone outcrop. The Petro City site (24RB302) is also a petroglyph and lithic scatter site located on a low ridge extending from the a larger ridge. The site consists of both prehistoric and historic petroglyphs or rock art and historic graffiti. Both sites were originally determined not eligible for the National Register under any of the National Register criteria, in a letter from the Montana State Historic Preservation Office dated May 14, 1982 (Bohman 1992). A May 11, 1994, consensus decision recommended these two sites as eligible (see below).

TRADITIONAL LIFEWAY VALUES

In 1992, BLM contracted with Ethnoscience of Billings, Montana, an archeological and ethnographical contractor, to conduct an ethnographic study of the project area (Kooistra-Manning and others 1993). This study's purpose was to assess cultural impacts to the Northern Cheyenne, Crow and Sioux tribes from expanding coal development at the Rosebud Mine near Colstrip, Montana. This study attempted to identify archeological sites or locations that had long-term and widely-recognized cultural and spiritual significance, areas currently used or valued for contemporary cultural and ceremonial practices and strategies to mitigate anticipated impacts to these cultural resources from the expanding coal development.

Ethnoscience conducted extensive consultations with tribal representatives and Elders of the Northern Cheyenne, Crow, and Sioux to attempt to identify their concerns regarding anticipated impacts from this proposed coal lease. In the process, they solicited recommendations for the respectful treatment of locations identified as culturally and spiritually significant.

Three types of Native American concerns are relevant to the evaluation of impacts to sites in the project area: coal and traditional cultural properties; sites with intangible spiritual attributes and contemporary use areas (see appendix 9.) Culturally significant geological features and traditional resource gathering areas may also qualify as traditional cultural properties.

The results of the ethnographic study identified the two sandstone outcrops with prehistoric and historic petroglyphs, the Lovelace Memorial site and the Petro City site in section 32, T. 2 N., R. 40 E., which qualify as traditional cultural properties. Northern Cheyenne representatives visited these two sites which they identified as being culturally and spiritually significant and reported that they should be undisturbed.

Based on a recent consensus decision dated May 11, 1994, both are now recommended as eligible for the National Register of Historic Places as traditional cultural properties under criteria A and C, for their association with fasting and vision questing and distinctive petroglyph styles which are valued for traditional cultural and spiritual reasons.

These two petroglyph sites have further significance to the Northern Cheyenne because the etchings are considered sacred symbols. These sites might represent a religious site, a vision quest site or a possible fasting area. A mineral deposit within the sandstone outcrop, at the Petro City site, contains a yellow paint which the Northern Cheyenne use for ceremonies. A sagebrush lizard, which also has significance in the Cheyenne sundance, was also observed at the Petro City site.

Based on interviews, correspondence and visits to these two sites, Ethnoscience found that tribal representatives and

Elders are concerned that coal development is disrupting and will continue to disrupt the spiritual environment, destroy cultural resources and endanger plant and wildlife habitats. They are also concerned that mining activities will destroy these two sites. When the land is disturbed by strip mining the Northern Cheyenne become concerned over the loss of the spiritual integrity of the land and the loss of spiritual balance.

This loss is particularly difficult for the old people. They have a demoralizing feeling of hopelessness because of the threat to the spiritual balance and their spiritual well-being through the disregard of sacredness by nonIndians.

These sites retain their integrity of relationship because the Northern Cheyenne representatives and Elders identified specific motifs from the panels which are sacred symbols associated with fasting. The sites also retain integrity of condition because the petroglyphs are discernable and the panels remain intact. Although the setting of the sites have been disrupted and disturbed by the placement of the road and mining activities in the area that have intruded on the viewshed and the audible environment of the sites, this disturbance of the site setting, however, does not diminish the traditional cultural value of the sites from the Northern Cheyenne point of view.

These same two petroglyph sites, the Lovelace Memorial and the Petro City, are also considered to have intangible spiritual attributes. These are sites, landforms or landscapes that have spirits or spiritual relationships associated with them. These two sites were interpreted to have sacred symbols associated with fasting and vision questing.

According to the Northern Cheyenne, the landscape around the Rosebud Mine area is imbued with spirits. Disturbance from mining has forced some spirits to leave the area, possibly never to return. Water, plants, animals, springs, caves and sandstone formations are known to have associated spirits which the Northern Cheyenne respect and value for the continuation of their spiritual traditions.

No contemporary use areas were identified on the six tracts. However, there is one location which contains resources valued by the Northern Cheyenne for cultural, ceremonial and medicinal purposes. At the Petro City site there is a mineral exposure which the Northern Cheyenne use to make yellow paint to use in ceremonies. A lizard, which is a significant symbol in the Northern Cheyenne sundance, was also observed at this site.

Although, the Northern Cheyenne recognize the cultural significance of lithic scatter sites, such as the Rabbit Ridge, the Normand Estates, and the Deadly Draw, these sites do not meet the eligibility criteria to be classified as traditional cultural properties because they lack features which can be associated with specific ceremonial or specialized traditional cultural activities.

Transportation

The transportation system and facilities servicing the WECo mine and Colstrip area consists of a series of roadways, a railroad network, an airport, and internal transportation facilities and networks to facilitate the mining operation.

Access to the area is gained from Interstate 94, south on Federal Aid Highway 39, which runs through Colstrip and Lame Deer. The East Fork Castle Rock Road, south of Colstrip, runs west to Areas B and C mining operations where the lands involved are located. Two-tract trails traverse most of the lands involved and provide vehicular access. There are no haul roads or other transportation facilities on the lands at this time although the company does have an overland conveyor which extends from Area C to Colstrip generating units 3 and 4, paralleling much of the East Fork of Armells Creek.

Other transportation facilities include a railroad spur which connects Colstrip and the Burlington Northern mainline located 25 miles north. The spur is used to haul coal from WECo's Rosebud Mine and the Peabody Coal Company Big Sky Mine to customers. A small private airport is located south of Colstrip and east of these lands. A power transmission line runs west from Colstrip through the mine south of Area C and north of Area B.

Ownership and Land Use

The surface of the lands in the application is private ownership, involving three separate owners: Booth Brothers Land and Livestock, Great Northern Properties Limited partnership, and WECo. The coal ownership is federal minerals administered by the BLM.

The lands involved are native rangelands and agricultural lands (wheat farming). See the "Vegetation" section for a more complete description. These lands are incorporated into three ranching operations: Booth Brothers Land and Livestock/Keefer Ranch, Ashenhurst Ranch, and Snider Ranch.

These lands are used by wildlife and livestock grazing by these ranches. The average rangeland production is 0.25 to

0.30 animal unit months per acre in Rosebud County (Montana Department of State Lands and U.S. Office of Surface Mining Reclamation and Enforcement 1983).

There are two occupied residences on these lands. There is a mobile home at the old Castle Rock Post Office in T. 1 N., R. 40 E., section 6, which would probably be moved prior to mining as WECo has a lease agreement with the private surface owner. The other residence in T. 2 N., R. 40 E., section 32, is the old Lovelace place which is owned by WECo. This residence and the associated buildings are outside the area to be mined (Schwarzkopf 1993; Tickner 1993).

Hunting, primarily mule deer or game birds, is the main recreational use of the lands. Access is controlled by the private surface owner so permission must be granted before entering the lands.

Socioeconomics

SOCIAL CONDITIONS

The social conditions in Rosebud County, including the Northern Cheyenne Reservation, are discussed in detail in the Peabody Environmental Impact Statement (Montana Department of State Lands and U.S. Office of Surface Mining Reclamation and Enforcement 1988a), the Powder River Round 1 Economic, Social and Cultural Supplement (USDI, BLM 1990), and in the Social and Economic Effects of Coal Development on the Northern Cheyenne Tribe (USDI, BLM 1986).

The 1990 population of Rosebud County was 10,505, an increase of 6 percent since 1980 (see table 3.7). In 1983 the population of Rosebud County peaked at 14,000 with the construction of Colstrip generating Units 3 and 4. Since then, many power plant construction workers, other temporary workers, and the families of these workers have moved away. The population of the Northern Cheyenne Reservation grew 7 percent between 1970 and 1980 and showed a similar peak during the mid-1980s. The Indian population on the Reservation increased 14 percent during the 1980s while the nonIndian population declined by one-third during this time period.

Colstrip, an unincorporated community of about 3,185 (U.S. Department of Commerce, Bureau of the Census 1990), developed from a community of about 250 in 1970 in response to coal development. People who moved into the community for mine-related employment created a whole new set of social relationships. The community has begun to stabilize after the peak population in the mid-1980s. Public services and infrastructure capacity in Colstrip continue to be adequate (Holzworth 1993). A new medical clinic opened recently and, to increase recreation options, a golf course was built two years ago. Colstrip is relatively underdeveloped commercially and much of the local trade goes to larger cities such as Miles City or Billings.

TABLE 3.7
DISTRIBUTION OF INDIAN AND NONINDIAN POPULATION, ROSEBUD COUNTY AND NORTHERN CHEYENNE RESERVATION

Area	1980 Population	1980 Percent	1985 Population	1985 Percent	1990 Population	1990 Percent
Rosebud County						
NonIndian	7,466	75	8,890	77	7,698	73
Indian	2,433	25	2,672	23	2,807	27
TOTAL	9,899	100	11,562	100	10,505	100
Northern Cheyenne Reservation*						
NonIndian	562	15	565	13	381	10
Indian	3,102	85	3,826	87	3,542	90
TOTAL	3,664	100	4,391	100	3,923	100

Source: U. S. Department of Commerce, Bureau of Census 1990.

*Includes persons living on portions of the reservation in Big Horn County.

The Rosebud County ranching community has, in general, not benefitted financially from energy development (Montana Department of State Lands and U.S. Office of Surface Mining Reclamation and Enforcement 1988a). Some area ranchers have ongoing concerns about hydrology in the areas that are being mined.

Northern Cheyenne tribal members tend to be socially, economically and politically separate from other residents of southeastern Montana. They have a strong sense of tribal identity based on a shared common language, culture and values, history, and political and social organization. The relative isolation of the Reservation has been an important factor in preserving Northern Cheyenne identity. However, the sense of isolation that the Reservation residents experienced earlier in this century has continually decreased as a result of a variety of activities, such as the coming of television in the 1950s and increased contact with nonNorthern Cheyenne, both on and off the Reservation. Regional coal development has increased these contacts; many Northern Cheyenne now travel to Colstrip on a daily basis for employment and education.

Problems with services and infrastructure such as law enforcement, health care, and housing continue on the Reservation. These problems are described in detail in the Powder River Round 1 Economic, Social and Cultural Supplement (USDI, BLM 1990). To meet the unique needs of the Reservation residents, the Montana Office of Public Instruction has established a high school district for the Northern Cheyenne Reservation. It will begin operations in temporary facilities in the fall of 1994. An act of Congress will be required to provide lands and permanent facilities dedicated to the school. High levels of unemployment and poverty continue to exist on the Reservation as shown in table 3.8.

TABLE 3.8
SELECTED CHARACTERISTICS

	Year	Rosebud County	Northern Cheyenne Reservation	State of Montana
Per Capita Income	1989	$10,415	$4,479	$11,213
Percent Population Below Poverty Level	1989	20	58	16
Percent Unemployment	1990	10.4	31.4	7.0
Persons 25 years and Older; Percent High School Graduate	1990	78	62	81

Source: U. S. Department of Commerce, Bureau of the Census 1990.

ECONOMIC CONDITIONS

The economy of Rosebud County is based upon its abundant natural resources. These resources include the land, which is used for crops and livestock production; coal, which is mined and converted to electricity; and the water and wildlife that offers outdoor recreation opportunities. The economic activity generated by the production, extraction, or utilization of these natural resources provides income and employment. The following discussion will build on information found in the Peabody Environmental Impact Statement (Montana Department of State Lands and U.S. Office of Surface Mining Reclamation and Enforcement 1988a) and the Powder River Round 1 Economic and Cultural Supplement (USDI, BLM 1990). A more complete description of the economy of Rosebud County and the Northern Cheyenne Reservation are found in those documents.

Recent Developments

Energy related developments continue to shift the economic base of Rosebud County from agriculture to industrial. The following table shows the energy related facilities and the date of operation.

TABLE 3.9
ENERGY DEVELOPMENTS

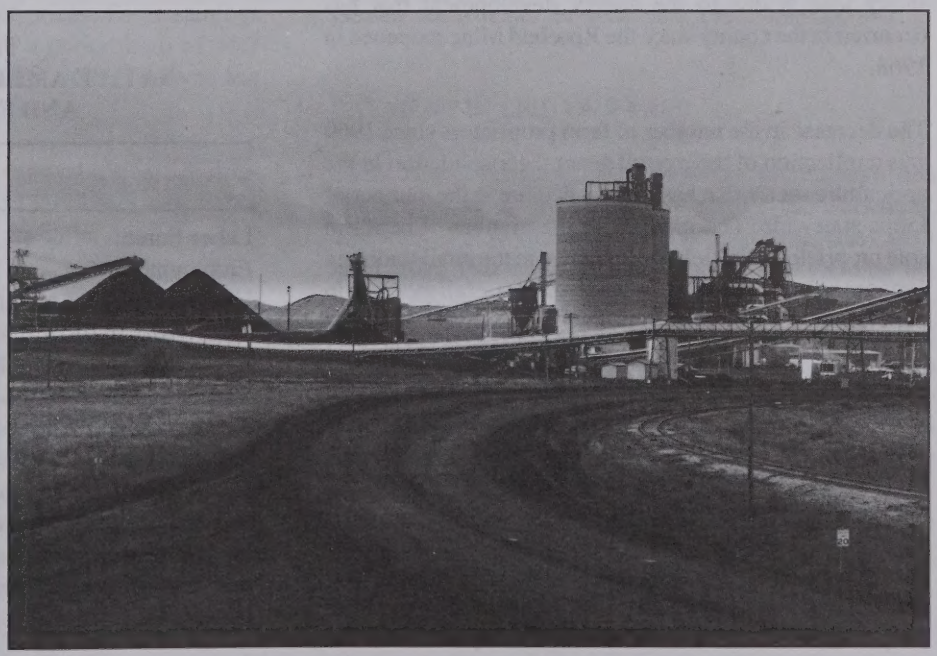
Facility	Operator	Date of Operation
Rosebud Mine	WECo	1968
Big Sky Mine	Peabody Coal Co.	1969
Colstrip Units 1 and 2	Montana Power Co.	1976
Colstrip Units 3 and 4	Montana Power Co.	1984
Advanced Coal Conversion Plant	Rosebud Syncoal	1991
Montana Generation Rosebud Synfuel	U. S. Operating Services	1990

No new mines are planned before the year 2000 (BLM Northwest Regional Evaluation Team 1993b). Two facilities have been built since the Peabody Environmental Impact Statement was completed. Montana Generation constructed a 35 megawatt independent power qualifying facility 7 miles north of Colstrip (Rosebud Power plant). The plant uses a fluidized-bed boiler to burn 250,000 tons per year of coal refuse from the Rosebud Mine. The coal refuse consists of the top 1 or 2 feet of the Rosebud seam which is higher in sulphur, has a lower heating value, and was previously removed and buried. The electricity is sold to Montana Power Company.

Rosebud Power plant, north of Colstrip

The Advanced Coal Conversion Plant was constructed at WECo's Rosebud Mine and became operational in 1991. The plant is owned and operated by Rosebud SynCoal Partnership, a joint venture between WECo and Northern States Power. The plant employed 28 people as of March 1993. The plant will produce up to 300,000 tons per year of a dried and cleaned coal for export.

The Rosebud Mine produced 14.7 million tons in 1992 with a work force of 416 salaried and nonsalaried employees. Production and employment is ex-



Advanced Coal Conversion Plant

pected to decrease following the expiration of two Midwest utility contracts in 1994 and 1995, if replacement contracts cannot be secured.

Employment

The total number of jobs in the county was 5,548 in 1990, down 28 percent from 7,669 in 1982 which was the peak of construction on Colstrip units 3 and 4 (see table 3.10). It is more than double the pre-energy development level in 1969 and 8.8 percent above the 1980 level.

TABLE 3.10
EMPLOYMENT

County	1969	1980	1982	1990
Total	2,583	5,100	7,669	5,548
Wage and salary	1,850	4,327	6,814	4,549
Proprietors	733	773	855	999
Farm	423	313	326	329
Nonfarm	310	460	529	670

Source: U. S. Department of Commerce, Bureau of Economic Analysis 1993.

Total jobs include nonfarm sole proprietors, farmers and ranchers, and wage and salary employment. Wage and salary employment was 72 percent of the total employment in 1969, and 82 percent of the total in 1990, down from 89 percent in 1982 (see table 3.11). The statewide average for 1990 was 76 percent. The higher percentage of wage and salary jobs is due to the energy development that has occurred in the county since the Rosebud Mine reopened in 1968.

The decrease in the number of farm proprietors since 1969 was a reflection of the overall general consolidation in the agriculture sector that has led to a decline in the number of farms statewide. The increase in the number of nonfarm sole proprietors parallels the increases in the retail trade and services sectors, which are related to the overall increase in population in the county.

Portions of the Northern Cheyenne Reservation are located in Rosebud County. The Reservation economy is partially affected by the basic industries located off the Reservation and the economy has benefitted from the jobs created by energy development. The labor force and employment estimates for Native Americans on and adjacent to the Reservation are shown in table 3.12. The Tribe has employment preference agreements with Montana Power Company and WECo. Native American employment in 1988 was 133 at the Colstrip units and 39 at the Rosebud Mine (Montana Department of State Lands and U.S. Office of Surface Mining Reclamation and Enforcement 1988a). According to WECo there were 54 Northern Cheyenne employed at the mine in March 1993 (appendix 6).

TABLE 3.11
WAGE AND SALARY EMPLOYMENT
FULL TIME AND PART TIME

Sector	1969	1980	1982	1990
Agriculture Services	30	45	48	65
Mining/Oil & Gas	38	448	461	519
Construction	88	870	2,269	309
Manufacturing	205	156	35	141
Trans/Pub Util.	(D)	(D)	(D)	864
Wholesale Trade	19	33	(D)	36
Retail Trade	306	586	698	577
Finance, Insurance and Real Estate	32	101	101	117
Services	(D)	(D)	1,345	1,442
Government				
State and Local	298	536	650	667
Federal	165	216	193	315

Source: U. S. Department of Commerce, Bureau of Economic Analysis 1993.
(D)=Not shown to avoid disclosure of confidential information.

TABLE 3.12
NATIVE AMERICAN LABOR FORCE
AND EMPLOYMENT

	1970	1979	1983	1990
Labor Force	720	1414	1442	981
Employment	509	889	1057	697
Unemployed	211	525	385	284
Unemployment Rate	29.3%	37.1%	26.7%	29%

Native American employment peaked in 1983 during the construction of Colstrip units 3 and 4. Unemployment rates for Native Americans have historically been much higher than county averages. The corresponding rates for Rosebud County were 3.1, 5.1, 9.2, and 7 percent.

Income

Total personal income is the most comprehensive measure of all income flows in an area. It includes income from wages and salaries, employee benefits, sole proprietors, property income (interest, dividends, and rent), and government transfer payments (social security, medical payments, and unemployment insurance). Income and earnings for selected years are shown in table 3.13.

TABLE 3.13
ROSEBUD COUNTY
INCOME AND EARNINGS
(THOUSANDS OF DOLLARS)

	1969	1980	1982	1990
Personal Income	17,503	80,456	138,612	145,657
Nonfarm Earnings	13,147	73,501	136,878	135,879
Farm Earnings	4,356	6,935	1,778	10,778

Source: U. S. Department of Commerce, Bureau of Economic Analysis 1993.

Total personal income has increased dramatically as a result of energy development during the period. From 1969 to 1990 the total personal income of Rosebud County has increased by over 400 percent after adjusting for inflation. Nonfarm earnings peaked during the Colstrip units 3 and 4 construction. Farm earnings, which accounted for 25 percent of total personal income in 1969, fluctuated in response to drought conditions and market prices. Farm earnings have rebounded in late 1980's to a period high of 10.7 million dollars but their contribution to total income has fallen to 7.4 percent in 1990.

Per capita personal income also showed a significant increase from $2,887 in 1969 to $13,973 in 1990, a 384 percent increase before adjusting for inflation.

The distribution of income among county residents is more uneven than is typical in Montana. The county has higher proportions of individuals and families with both higher and lower incomes than do most counties. This is attributable to the higher than average wages of workers in the energy industries, and the high unemployment rates and larger family size among the residents of the Northern Cheyenne Reservation. As an example, the Department of the Interior estimated that the per capita income for the Northern Cheyenne was $4,280, compared with $9,781 for Rosebud County in 1986 (USDI, BLM 1986).

BLM's Contribution to Local Revenue

BLM's principal contribution to the taxable value of the counties arises from the value of the production of federal oil, gas, and coal in the area. The BLM administers a number of programs which provide for disbursements to local governments. The major sources of these revenues are federal mineral and grazing leases and payments in lieu of taxes.

MINERAL RECEIPTS

The Mineral Lands Leasing Act of 1920, as amended, provides that one-half of the bonuses, rents, and royalties derived from federal mineral leases be returned to the state and counties for stated purposes. Federal mineral disbursements for fiscal year 1992 were 3.94 million dollars of which 3.85 million were from federal coal lease royalties. Federal coal production in Rosebud County was 5.8 million tons in fiscal year 1992. The average royalty per ton was $1.33. The remainder of the money was generated from federal oil and gas leases.

GRAZING FEES

The Taylor Grazing Act stipulates that states receive 12½ percent share of grazing fees collected inside grazing districts (Section 3 payments). The states also receive a 50 percent share of grazing fees collected outside organized grazing districts (Section 15 payments). Under the law, the state legislature of each state decides how the money is spent for the benefit of the counties. The Section 15 and 3 grazing fee receipts for fiscal year 1992 were $63,941.

PAYMENT IN LIEU OF TAXES

The federal government makes payments to counties in lieu of taxes for certain federal lands located in those counties. The amount of payment in lieu of taxes payments is calculated using two different formulas; the one yielding the largest amount to the county determines the level of payment in lieu of taxes. The payment in lieu of taxes for Rosebud County was $233,547 in fiscal year 1992. Each year funding for payment in lieu of taxes must be appropriated by Congress, and actual amounts paid to the counties must be prorated based on the funding level and the amount the county is due through the formula calculations. Generally, the amount appropriated for payment in lieu of taxes is less than the full funding level, so a percentage of the full amount due is distributed to the counties.

Data Adequacy

Regional Data Adequacy Standards were developed for the Powder River Coal Production Region in November 1987 (USDI, BLM 1987). Their purpose is to define the general data base necessary for coal leasing and mitigation decisions in the region. Resource data used in this document meet or exceed standards for all resources analyzed.

Chapter 4

ENVIRONMENTAL CONSEQUENCES

CHAPTER 4
ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

This section describes the environmental and socioeconomic effects of the Preferred alternative to approve the coal lease application and mine these federal coal lands, the No Action alternative to deny the coal lease application and not allow these federal coal lands to be mined, and the Cultural Resource Avoidance alternative. The site-specific and cumulative effects of these alternatives are analyzed and described herein.

Analyses of the following resources were taken from the environmental documents referenced in the "Introduction" to chapter 3.

Climate and Air Quality	Visual Resources
Paleontological Resources	Wildlife
Transportation	Soils
Vegetation	Hydrology

Those issues and resources that needed further analysis are fully described here. Mitigation measures that could reduce or eliminate adverse impacts, residual impacts that would remain after mitigation measures, and cumulative impacts from the Preferred alternative are presented. Short-term impacts from the project are those impacts that would occur from mining through the life-of-mine and generally can be mitigated; whereas, residual or long-term impacts are impacts that remain after mining and reclamation is complete.

Cumulative impacts are those impacts from the proposed project coupled with impacts from other reasonably foreseeable development of other known projects in the general area. Development projects include WECo's Advanced Coal Conversion Project which could possibly increase production and expand its current operation (Price 1993). Montana Power Company is working on projects that may increase efficiency somewhat and several local businesses are working on minor construction projects. Overall development projects in the area are minor and would have little impact to the economy of the region, other than to maintain or stabilize the present economy at or close to the existing level.

The geographic limits of the analysis for the probable impacts encompass those lands in the coal lease application and the lands adjacent to them for the renewable (vegetation, wildlife) and nonrenewable (coal, minerals) resources. Socioeconomic geographic impact limits would include Colstrip, Rosebud County, and the Northern Cheyenne Indian Reservation.

PREFERRED ALTERNATIVE

Climate and Air Quality

Continued mining would not have any impact on the climate in the Colstrip area. No major sources of atmospheric moisture are produced by the mine, nor is there significant differences in color after reclamation to change the climate. Suspended particulate concentrations are not significant enough to affect incoming solar radiation or to produce changes in cloud formation.

The major source of pollutant to air quality in and around the mine would be particulate matter. The most significant component of the particulate matter emission would be fugitive dust from heavy equipment and the mining. Since the particulate matter quickly settles out, the impacts would be localized and most evident near the mining activity. Air quality in the Colstrip area would not change significantly as a result of the continuation of mining of these lands. WECo currently operates under Air Quality Permit No. 1570A, issued by the Montana Air Quality Bureau. The permit and the application describe air quality related issues in detail. Air quality is continuously monitored as part of the overall operation.

Visual Resources

Since these lands have no unique visual resources and existing mining operations tend to dominate the visual landscape features, the impacts to the visual resources would be minimal. Mining of these lands and the associated mining activities would modify the landforms and change the aesthetic qualities of the area over the short term. There would be a loss of diversity when the Ponderosa pine vegetative types, topographic breaks and rock outcrops are mined and replaced with less rugged, rolling grasslands. The reclaimed areas tend to be more uniform in color,

texture, and diversity and contrast noticeably with the surrounding undisturbed area. Even so, the visual impacts to these lands would be minimal and insignificant because of the mining that has taken place over the years in the area.

Noise

Noise levels in the area would remain the same when these lands are mined as part of the existing operation. The normal background level noise would remain the same. As the mining operation approaches the WECo's Area C operation buildings and the East Fork Castle Rock Road, employees and travelers would notice the increased noise levels of the mining activities. Since the Area C employees would be inside buildings and travelers would be in vehicles, the impacts would not be significant.

Geology and Topography

The surface and subsurface characteristics of these lands would be radically changed by mining. After topsoil and subsoil removal, the overburden is drilled, blasted, and removed to mine the coal underneath. Normally, the overburden is removed by dragline and placed directly in the previously mined out area. This results in a mixture of replaced overburden physically different than in-place overburden. The topsoil and subsoil removal results in a homogenous mixture after mining.

Approximately 903 acres would be mined and 1,316 acres of the lands involved would be disturbed by the mining operation. Approximately 745 acres would not be disturbed. There would be approximately 35.1 million tons of federal coal removed from the Rosebud seam. Deeper underlying coals such as the McKay coal seam would not be mined at this time and would probably be lost to future recovery. There would be approximately a 6 percent recovery loss of the Rosebud, as mining is not 100 percent efficient.

The removal of the Rosebud (average 22.3 feet thick) would result in postmining elevations slightly lower than the premining elevations. Although 22.3 feet of thickness is removed, the overall elevation would not change that much because of the overburden swelling. The final postmining topography would generally be a somewhat flatter landscape.

Some habitat features of the premining topography and landscape would be destroyed by the mining. Rock outcrops and some vegetative features, important to wildlife, would be destroyed and would not be replaced to the same extent as premine conditions.

Other Minerals

The development of other minerals, such as oil and gas, locatable minerals, coal bed methane, scoria, sand and gravel, or geothermal resources would not occur during mining. The probability of some of these minerals, such as the oil and gas and coal bed methane, occurring on the federal coal lands would be low. While the ownership of these minerals is private, WECo has lease agreements with the private surface and mineral owners stating that federal coal has primacy in development over the private minerals (Tickner 1993).

Soils

Impacts to the soils from mining would be changes in the physical, biological, and chemical properties of the soils. To offset these impacts and to aid in reclamation, WECo selectively handles the soils. Major soil groups are mapped and the depths to which the topsoil and subsoil are salvaged is dependent upon the soil group. In areas of thinner, less-developed soils, less topsoil and subsoil are salvaged than the amount salvaged on the more well-developed alluvial loamy and clay soils. Generally, the soils are salvaged in two lifts (topsoil and subsoil) by heavy equipment, except tree-growing soils are salvaged in one lift and the Yadam soil series (gumbo knobs) is not salvaged. By directing hauling and placement of the salvaged topsoil and subsoil on the reclamation lands when possible, soil impacts are considerably reduced.

Biological impacts would include a reduction in soil organic matter, microbial populations, and live plant parts. In the topsoil salvaging operation, the various soil series are salvaged by depth and mixed with the other soil series resulting in a homogenous mixture of the soils and nutrients. Where the soils are stockpiled before placement, additional reduction in the soil microbial populations can be anticipated, as well as a decline in the organic matter content and reproductive capability of plant parts.

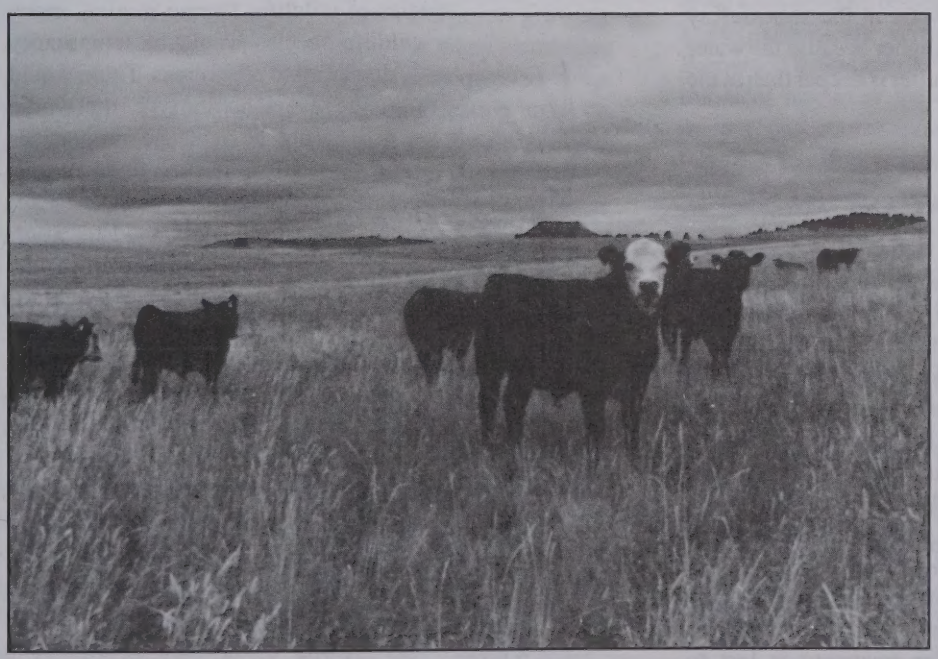
Physical impacts would include an increase in near-surface bulk density which influences infiltration and runoff and a reduction in variability in the landscape. This reduction includes elimination of bedrock, especially along ridges and hills. The homogenous mixture of the soils on the reclamation lands would result in more uniform vegetation and a reduction in the landscape variability.

Chemical impacts would result in a homogenous distribution of the salt contents of the soils. The reclaimed soils would take considerable time to re-establish any patterns of chemical constituents or deposition.

Vegetation

Approximately 1,316 acres of vegetation would be destroyed by mining these lands. The impact would be temporary and short term. Reclamation by WECo has been quite successful in reestablishing the various vegetative types in this area. The plant communities would be reclaimed primarily with native plant species. Postmine forage production would likely exceed premine production levels with proper management; however, plant species diversity would be less. Plant diversity would increase in time as more plant species invade the reclaimed areas.

There would be an overall decrease in the cropland as these sites are reclaimed to native rangelands. The postmining land use is to reclaim these lands for livestock grazing and wildlife habitat. WECo has a successful grazing program on the reclamation lands involving six local ranchers. The company uses a prescribed grazing system involving numbers of cattle and duration of grazing based on the pasture size and historic use. A total of 601 cattle are expected to graze 3,600 acres involving 34 pastures on the overall WECo mining operation this year (Waage 1993).



Cattle grazing

Hydrology

Limited minor impacts to groundwater and surface water on or near the application lands due to coal mining are anticipated. The nature and extent of these impacts have been analyzed in several environmental impact statements and numerous studies which included the application lands. Appendix 10 shows additional hydrological impact analysis of the area by Montana Bureau of Mines and Geology. Hydrologic impacts of coal mining have been measured using the surface water and groundwater monitoring network.

GROUNDWATER IMPACTS

The Rosebud coal seam, where it is economically feasible to mine, is removed then replaced with overburden material to form the spoil aquifer. Coal would be mined from approximately 1.5 square miles within the 3.2 square miles of the application lands.

After mining, the spoil aquifer is saturated mainly by lateral flow from the unmined portion of the Rosebud coal seam. Infiltration of surface water downward through the spoil is also a minor source of recharge to the spoil aquifer. Downward flow from the spoil aquifer is retarded by the interburden, a low permeability layer that separates the Rosebud from the McKay coal seam. The interburden is not disturbed by mining.

Spoil material is broken into smaller fragments when it is handled during mining which exposes more soluble salts. Studies (Van Voast and others 1977, 1988) have shown that the total dissolved solids of the spoil aquifer is highest shortly after initial saturation. The amount of increase varies but is about 50 to 130 percent. Total dissolved solids concentrations then decrease after the first pore volume of water flows through the aquifer. This decrease is expected to continue over a period of tens to thousands of years until the total dissolved solids concentrations approximate premining conditions.

Impacts to aquifers underlying the spoil aquifer will be mini-

mized by the presence of the low permeability confining units which separate these aquifers. Dilution from lateral flow through the aquifers will significantly reduce the possibility of impacts to water quality in the underlying aquifers. Because the McKay directly underlies the interburden (the confining unit under the spoil aquifer), it will receive limited downward flow from the spoil aquifer. It appears that at least in some areas exploration boreholes are connecting unmined and mined aquifers. The impact to water quality has not been investigated yet but the hydraulic connection indicates a potential for poor quality water moving into the deeper aquifers. Changes in total dissolved solids concentrations in the McKay aquifer are expected to remain within the range of natural premining water quality variations.

Aquifers below the McKay are unlikely to experience any measurable increase in total dissolved solids because of the presence of additional confining units as well as the larger volume of lateral flow. Where groundwater in the spoil aquifer discharges into the valley fill aquifer, a potential exists for increased total dissolved solids concentrations. Total dissolved solids levels are expected to remain within acceptable limits for livestock watering. In some cases the water quality in the spoil and valley fill aquifers are similar.

Postmining groundwater resources of suitable quality for livestock watering and domestic use excluding drinking water will be available from the sub-McKay aquifer and in some cases the spoil aquifer within the application lands. Although the sub-McKay aquifer is commonly used as a source of drinking water, it usually does not meet drinking water standards for total dissolved solids. Costs associated with maintaining and pumping wells in the sub-McKay aquifer are expected to be slightly higher because the water level of wells in the sub-McKay aquifer is deeper than in the Rosebud at most locations

SURFACE WATER IMPACTS

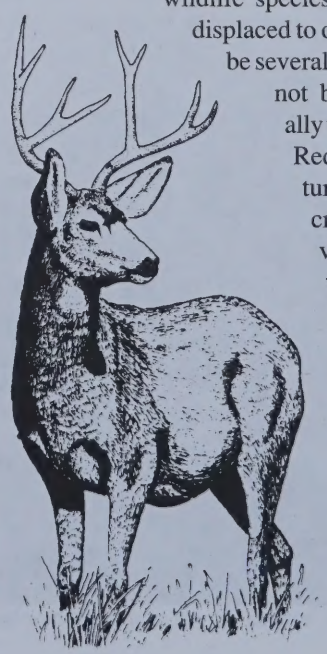
During mining activities, surface water runoff is regulated by the Montana Pollutant Discharge Elimination System. Any discharge of surface water from disturbed lands is required to meet the water quality standards stipulated in the permit. Because the mine operator is required by law to meet these standards, the potential for downstream impacts to water quality from runoff is minimal. Discharges from events in excess of the 10-year, 24-hour storm will have a higher suspended solids content than other discharges; however, the suspended solids from these discharges will be similar to that from native drainages. In some cases the quantity of runoff will be reduced because part of the water impounded in sediment ponds for treatment is lost to evaporation or is used by the mine operator. Discharge of the water from sediment ponds may be delayed until after the runoff event to allow suspended solids to settle.

Runoff from reclaimed lands after mining is generally similar in quality to that from undisturbed lands. Postmining slopes on reclaimed lands are flatter than typically occur prior to mining. Vegetation on these reclaimed slopes is more dense than on the steeper premining slopes. These factors cause the volume of runoff from reclaimed lands to be slightly less than that which occurred prior to mining.

Springs in the vicinity of the application lands which are fed by groundwater from the Rosebud coal seam may experience a reduction in flow volume during mining due to drawdown of the water table. In some cases the volume of flow may be increased by recharge of the valley fill material from sediment ponds at the lower edge of mining, upstream of the springs. Total dissolved solids levels in these springs may increase after mining because the spoil aquifer supplying water to the springs is expected to have a higher total dissolved solids than the Rosebud coal aquifer. Water quality in these springs is expected to remain suitable for use as a livestock water source as long as the flow is not impounded. If water from these springs is impounded, evaporation may concentrate the total dissolved solids to levels above those recommended for livestock water sources.

Wildlife

Impacts to wildlife generally stem from the disturbance of those areas, features, and habitats important to the various species of wildlife. During mining, many wildlife species would be temporarily displaced to other areas. There would be several habitat types that would not be replaced proportionally to the pre-mine acreages. Reductions in the agricultural lands, sandstone outcrops, and ponderosa pine vegetative type would adversely affect many wildlife species that use the areas over the long term. The impact to wildlife by the destruction of these habitat types is not expected to be significant regionally.



Big game species would not be significantly impacted by mining. Big game species are very mobile and would probably be temporarily displaced to other areas during the mining and reclamation. Since there would be an increase in the grassland and shrub-like-grassland vegetative types after reclamation, pronghorn antelope would benefit from improved habitat and possibly increase in numbers over the long term. Mule deer would be affected by the reduction of the ponderosa pine vegetative type in the long term depending upon the reduction in the amount of acreage and reclamation success of this important component of their habitat in this area. Given the extensive use of the present reclamation lands and population control problems that WECo is experiencing, this may not be a problem overall or regionally. Elk and white-tailed deer would not be impacted given their infrequent use of these lands and the availability of other areas.

Mobile mammals (such as predators and rabbits) would be temporarily displaced to other habitats by mining. Long-term impacts to these species would not be significant as they tend to follow prey species population trends. Habitat-specific species such as porcupines or chipmunks would be adversely affected by the loss of these areas. Less mobile species (such as rodents) would suffer a decline in numbers and species during mining. Prey species generally have a tremendous reproductive potential and tend to adapt to the reclaimed areas quickly, so impacts would be minimal.

Although sharp-tailed grouse use these lands as feeding and nesting areas, mining these lands would cause minimal impacts and would be temporary. Two inactive leks would be destroyed by mining. There would be a decrease in the shrubs and trees as these plant species are slower growing species and would not reach maturity for many years after reclamation is complete. WECo has demonstrated some success in establishing leks and feeding/nesting areas on reclamation areas. Given this success and the sharp-tailed grouse population increase in and around the mining and reclamation areas, the long-term impacts should be insignificant.

Other upland game birds (such as ring-necked pheasants, Hungarian partridge, Merriam's turkey, and sage grouse) use these lands infrequently and would not be affected by mining. Waterfowl would not be affected since there is no suitable waterfowl habitat on these lands.

Mining would destroy one great-horned owl nest and hunting habitat for other raptors. There would also be a long-term reduction in suitable nesting habitat such as ponderosa pine vegetative types and rock outcrops. Mining would not have a significant affect on regional raptor populations. No threatened or endangered raptors, such as bald eagles, would be affected.

Other bird species such as songbirds, would be affected by mining because of the changes in habitat types. The reduction in the shrubs and trees would adversely affect songbird species and populations that need shrubs and trees for foraging and nesting. Grassland songbird populations would be expected to increase proportionally to the increase in grassland habitat after reclamation.

Few reptiles, amphibians, and fish would be affected by mining. Some reptiles would be displaced by the mining temporarily and would return to the area as reclamation progressed. There would be a resultant loss of habitat by reduced rock outcrops from mining. Few amphibians would be affected because of the lack of wetland habitat on these lands. There are no suitable waters or habitat for fish on these lands.

Recreation

Recreation would not be impacted by mining of these lands. There are no developed recreation facilities and dispersed recreational use (hunting and hiking) is only by permission of the private surface owner, the impacts would be insignificant. For the most part, these type of activities would be prohibited around mining operations for safety reasons.

Paleontological Resources

The impacts to paleontological resources from mining would be insignificant. Many common plant and invertebrate fossils would be destroyed by mining, but there are no known significant vertebrate fossils in the Fort Union Formation in this area. If buried or other significant paleontological resources are discovered during the course of mining, procedures and special stipulations would be followed in an effort to preserve and extract significant paleontological information (appendix 3).

Cultural Resources

CULTURAL PROPERTIES

Some cultural resources located on the proposed lease tracts would be irreversibly impacted and destroyed by mining. For the two prehistoric sites, the Rabbit Ridge (24RB310) and the Normand Estates (24RB883), that are considered not eligible for the National Register under criterion D, no further work or study is proposed on these sites. These sites would be destroyed by mining. Sites that have been determined not eligible would require no further

work prior to leasing and mining. Since they are not eligible they are of no further consequence or concern. These sites can be destroyed without further work occurring on them.

The Lovelace Memorial and the Petro City sites have been recommended eligible for the National Register of Historic Places under criteria A and C. Therefore, additional considerations must be given these two sites. They cannot be considered expendable like the other sites found not eligible. The revised Preferred alternative proposes mitigation measures which would prevent their destruction.

In T. 1 N., R. 39 E., two tracts in section 2 contain no cultural resource sites, and two tracts in sections 14 and 32 contain only one of the two noneligible sites. Coal lease decisions can be made on these three tracts without further cultural resource constraints.

The historic Castle Rock Post Office site (24RB335) has been determined eligible for the National Register. WECo, Montana Department of State Lands and the Montana State Historic Preservation Office are presently consulting on appropriate mitigation and the development of a mitigation plan for this site. A treatment plan will be developed for this site. Prior to this site's disturbance by mining, all important information and site detail will be collected for the permanent record. Because this site will be mitigated, there will likely be no adverse effect to this site from proposed mine development activities.

The historic Sweik Homestead site (24RB1066) has been determined eligible for the National Register, and the Deadly Draw site (24RB975) has been determined potentially eligible. There would likely be no effect and no impacts to these sites from the proposed mine development activities. During the past few years, the Sweik Homestead site was legally destroyed by the surface owner; therefore, nothing remains to be mitigated. Both sites would be located in the buffer zone area outside of the proposed mine plan area where no mine disturbance would occur. No mitigation has been proposed for the Deadly Draw site.

Leasing of all 2,061 acres in the Preferred alternative would eventually affect three cultural sites on these acres. This effect would be considered adverse requiring sites eligible for the National Register to be mitigated. There would likely be no adverse effect to the two eligible historic sites (Castle Rock Post Office and the Sweik Homestead), under criteria A and C, because the Castle Rock Post Office site will be mitigated and the Sweik Homestead site has been destroyed by its owner. There would likely be no effect to the two prehistoric sites (Rabbit Ridge and Normand Estates) as both have been determined to be not eligible. The two sites that have been determined not eligible are of no further consequence; two sites would be outside the area of mine disturbance and would not be impacted by mining; and the one eligible site that would be destroyed by mining will be mitigated prior to its disturbance.

TRADITIONAL LIFEWAY VALUES

In the draft environmental impact statement the Proposed Action would have resulted in destruction of two cultural sites, Lovelace Memorial and Petro City. This action cannot be mitigated by conventional means. The only acceptable method to mitigate these two traditional cultural properties satisfactory for Native American groups is through avoidance.

From the traditional Northern Cheyenne perspective, mining changes the living earth into dead earth. People would then have to "live in an area that is spiritually inert and cosmologically dead." ... This is "irreparable damage and is an impact that cannot be mitigated other than by not mining" (Kooistra-Manning and others, page 81, 1993). This loss is particularly difficult for the old people. They have a demoralizing feeling of hopelessness because of the threat to the spiritual balance and their spiritual well-being through the disregard of sacredness by nonIndians. Mining is considered to displace the spirits, causing the spiritual landscape to become empty. Although the mine can replace the trees and rocks through reclamation, the spirits are gone. These two sites that Native American groups have expressed a concern about would be destroyed and lost forever.

To mitigate impacts to these sites, the Preferred alternative has two stipulations which would be applied to the coal lease. No mining or mine related disturbance on federal coal lands would be permitted within a 160-foot buffer zone area of these sites, and trees would be planted to screen the cultural properties from intrusions. The mining company would not be allowed to disturb the sites or the area around the sites.

Transportation

The impacts to the existing transportation network would essentially remain the same. Since the federal coal lands are maintenance production tracts for the existing mining operation, this lease would extend the mine life. The existing transportation network would continue to be used for mining operations and by employees to about the same extent. The overland conveyor system used to move coal from the Area C operations to the generating plants will have its service extended in time by the additional mine life.

The East Fork Castle Rock county road would be relocated to effectively mine the coal near Castle Rock Post Office site. This action would require approval from the Rosebud County Commissioners. Transportation impacts would be insignificant.

Ownership and Land Use

The surface ownership of these lands would remain private regardless of mining. WECo owns or has valid consent from the surface owners of these lands to disturb the surface and mine the coal.

During mining, the federal coal lands and some of the adjacent lands would be unavailable for recreation purposes, livestock grazing, and farming. WECo anticipates mining 6 to 7 million tons of coal per year from Area C. Given this rate, approximately 170 acres would be disturbed each year by mining. With a time period of about three years for topsoil-overburden-coal removal to spoil grading and topsoil replacement, approximately 500 or more acres would be continuously disturbed by mining at any given time in Area C. These figures include the federal coal lands in the application and the adjacent private and state coal lands that would be mined as part of the overall mining operation.

Portions of these lands would be temporarily removed from livestock grazing and farming during mining operations. The impact would be short term and minimal after reclamation is complete. The reclamation plan is to return most of the lands to their premine vegetative type conditions or better. The result would be an increase in the livestock grazing lands and a slight decrease in farmland after mining and reclamation (Martin 1993).

Socioeconomics

SOCIAL IMPACTS

The continuation of mining in Area C would not affect current social conditions in Colstrip because there would be no change in employment or population levels. Likewise, community services and infrastructure would not be affected.

The continuation of mining in Area C would not affect employment, population, infrastructure or services on the Northern Cheyenne Reservation. However, mining influences the culture of the Northern Cheyenne. Continuation of mining perpetuates this influence to some extent (Montana Department of State Lands and U.S. Office of Surface Mining Reclamation and Enforcement 1988a). Mining the area could harm the cultural value of the area to the Northern Cheyenne. They believe mining would diminish the natural and spiritual qualities of the area (see the "Traditional Lifeway Values" sections).

ECONOMICS

The Preferred alternative would result in the continuation of mining in Area C as described in the environmental assessment Life-of-Mine Amendment Application prepared by the Montana Department of State Lands and the U.S. Office of Surface Mining Reclamation and Enforcement in November 1988. According to WECo there would be no increase in annual production or employment as a result of the Preferred alternative (appendix 6 - responses 1 and 2). There would be no change in the projected state and federal production taxes or income and no significant impact to the local economy (see tables 3-10, 3-11, 3-13 and "Economic Conditions" in chapter 3). There would be a decrease in federal royalties received compared to WECo's Proposed Action. Approximately $600,000 in federal royalties, or 1 percent of the total, would be lost because of the coal left in-place under the traditional cultural properties and the buffer zone. Since the federal tracts to be mined are overlaid by privately-owned surface, there will not be any change in grazing receipts or payment in lieu of taxes payments as a result of the Preferred alternative.

NO ACTION ALTERNATIVE

Under the No Action alternative, the coal lease application would be denied. WECo would continue mining coal in this area, but combinations of existing leases on federal, state, and private coal lands would be mined. Appendix 6 shows the company's plan of development and operation for other federal, state, and private coal lands should this coal lease application be denied.

Impacts directly associated with mining the federal coal lands in this application would not occur. Rather, the impacts would be shifted to other coal lands and there would be some differences in the impacts shown in the Preferred alternative. Approximately 903 acres of other coal lands would be mined, although the total acreage for disturbance would be considerably greater (approximately 1,300 acres). Impacts to resources (such as air quality, topography, soils, vegetation, wildlife, and hydrology)

would increase because of the steep terrain and high overburden associated with the replacement lands to be mined.

Hydrologic impacts anticipated, if the application lands are not mined, are similar to those anticipated if mined because of the extent of future mining adjacent to the application lands. Additional information is presented in appendix 10. If the lands are not mined, the following hydrologic impacts would be expected:

A redistribution of mining related disturbance from the Stocker Creek drainage to the East Fork Armells Creek and West Fork Armells Creek drainages where the replacement coal reserves lie.

A delay of groundwater impacts on and directly downstream of the application lands. Water flowing from the spoil aquifer would have a longer flow path through the Rosebud coal seam changing the timing of any groundwater impacts.

Cultural resources on these lands would not be disturbed or destroyed by mining. However, WECo would mine nonfederal coal elsewhere. This could disturb an unknown number of cultural sites: traditional cultural properties, intangible spiritual attributes, or contemporary use areas. Cultural resource protection mandates would then have to be met as part of the mine plan permitting process. Responsibility for insuring cultural resource protection would rest with the Office of Surface Mining Reclamation and Enforcement, instead of the BLM.

Social impacts would be similar to the Preferred alternative, except the cultural impacts identified on the application lands would not occur. Traditionalists, and others who support the traditionalists, would favor this alternative over the other alternatives. The mining of nonfederal coal could have unknown cultural impacts.

Economic impacts and benefits may or may not be fully realized. Because of the additional cost to mine the replacement coal, WECo's profits would be considerably reduced by not having replacement coal that is economically desirable to supply their customer's demand. In turn, their customers could buy some or all of their coal from other coal mining companies in the Powder River Coal Production Region. This is a highly likely scenario with these coal contracts possibly shifting to Wyoming coal companies.

WECo prepared a description of their operating plan if the tracts were not leased (appendix 6). The company intends to maintain production at its current level in Area C by mining adjacent existing private and federal coal leases. The company provided an estimate of the amount of federal coal and private coal to be mined under the No Action alternative versus the Preferred alternative. The total amount of coal mined would be the same, so the amount of federal and state production taxes would be the same. The amount of federal coal mined would be significantly less in the No Action alternative, 6.3 million tons, than under the Preferred alternative, 35.1 million tons. The loss in federal royalties based on a fiscal year 1992 average for Rosebud coal of $1.33 per ton (company estimated $1.35 per ton for calendar year 1992) would total $39 million over the life of the mine (measured in 1992 dollars).

There would be no significant change in employment, although the higher stripping ratios and longer haul distance associated with the replacement coal would likely require additional equipment and man-hours per ton uncovered. Any additional employees needed would offset the projected decrease of 50 to 60 employees after 1995 when the two Midwest utility contracts expire.

The federal coal lands in this application could and probably would be bypassed for mining in the future as it would be difficult to justify mining these lands given the checkerboard ownership pattern.

CULTURAL RESOURCE AVOIDANCE ALTERNATIVE

Under this alternative, the coal lease application would be approved. Two cultural properties in T. 2 N., R. 40 E., section 32, which have values as traditional cultural properties and sites with intangible spiritual attributes would be avoided by excluding federal coal lands in and around these two sites from the coal lease application. No contemporary use areas were identified on these lands.

The Lovelace Memorial site (24RB301) would be avoided by excluding 40 acres and the Petro City site (24RB302) would be avoided by excluding 30 acres. Although 70 acres would be excluded from the coal lease application, additional federal coal lands would be excluded because it would not be feasible to mine these areas by a strip-mine operation. A total of 152 acres and 6.5 million tons of recoverable federal coal would be excluded by this action.

Of the remaining lands in the coal lease application (1,991 acres), approximately 740 acres would be mined and 1,075 acres would be disturbed. Only 29.1 million tons of federal coal would be recovered; 6.5 million tons of federal coal would be left in-place in and around the two cultural properties and bypassed for mining.

Most of the impacts directly associated with mining the federal coal lands would occur. The full degree of impacts would not be realized as only 82 percent of the federal coal in the application would be mined. Impacts to resources, such as air quality, topography, soils, vegetation, and hydrology, would be less than the Preferred alternative and the No Action alternative. Some resources, such as wildlife and cultural resources, would benefit if these two cultural properties would be left undisturbed.

Social impacts would be similar to the Preferred alternative, except the impacts to the cultural resources would be partially mitigated by the buffer zone. Traditionalists, and others who support the traditionalists, would favor this alternative more than the Preferred alternative, but less than the No Action alternative. Economic impacts and benefits are directly affected by this alternative. Instead of 35.1 million tons of federal coal, only 29.1 million tons would be mined. This equates to a loss of 8.8 million dollars in federal royalties under this alternative, versus a loss of 39 million dollars under the No Action alternative.

The bypassed federal coal would probably become economically unrecoverable for future generations and lost for all practical purposes. The economic values and benefits associated with federal coal would never be realized.

EXISTING PERMIT REQUIREMENTS

All the lands in the application have been included in permits approved by the Montana Department of State Lands and the U.S. Office of Surface Mining Reclamation and Enforcement. The resources and mitigation measures are incorporated into the permits as special stipulations and conditions and techniques that WECo must comply with as part of their mining operation. These measures and techniques are designed to offset or eliminate the impacts of mining these lands. Special stipulations that have been approved by the two regulatory agencies for Area C, and most of these lands with the exception of T. 1 N., R. 40 E., section 14, are shown in appendix 4.

WECo operates the Rosebud Mine under Air Quality Permit 1570C, issued by the Montana Air Quality Bureau. The permit and the application describe air quality issues in detail and air quality is monitored continuously. WECo would still be required to comply with the conditions and air quality mitigation measures outlined in the permit. These measures are the following:

(a) periodic watering of unpaved roads;

(b) chemical stabilization of unpaved roads with proper application of magnesium chloride;

(c) prompt removal of coal, rock, soil, and other dust-forming debris from roads and frequent scraping and compaction of unpaved roads to stabilize the road surface;

(d) restricting the speed of vehicles as much as possible to reduce fugitive dust caused by travel;

(e) revegetating, mulching, or otherwise stabilizing the surface of all areas adjoining roads that are sources of fugitive dust;

(f) restricting the travel of unauthorized vehicles on other than established roads;

(g) minimizing the area of disturbed land;

(h) prompt revegetation of regraded lands;

(i) control of dust from drilling, using water sprays, and a dust deflector;

(j) restricting the areas to be blasted at any one time to reduce fugitive dust;

(k) restricting activities causing fugitive dust during periods of air stagnation;

(l) extinguishing any areas of burning or smoldering coal and periodically inspecting for burning areas whenever the potential for spontaneous combustion is high;

(m) reducing the period of time between initially disturbing the soil and revegetating the soil and revegetating or other surface stabilization.

Mitigation measures for noise levels include proper muffling and maintenance of heavy equipment used in mining, ear protection for employees in accordance with the WECo safety plan, and blasting in accordance with an approved blasting plan.

As part of the conditions for their permit approval, WECo would reclaim these lands to approximate premining topography. The drainages and divides would be reclaimed in the approximate locations as before mining and erosion control measures initiated until these areas are stabilized and reclamation is complete. Specific reclamation techniques are detailed in the Permit - Volume 2 (WECo 1984). Overall, the landscape would tend to be slightly smoother and lower after reclamation.

Impacts to soils are reduced considerably by proper handling of the soils from the time of salvage through reclamation. WECo uses a presalvage soil sampling program whereby the soils are staked and selectively salvaged by depth to acceptable limits. Direct hauling and placement of the salvaged topsoil and subsoil for reclamation is used when possible. This reduces soil impacts considerably. More specific details on soils, impacts, and erosion control measures are outlined in the permit.

Impacts to vegetation are reduced considerably by a good reclamation plan and program. WECo's vegetation reclamation program and plans are outlined in detail in the Permit - Volumes 2 and 11 - Exhibit C (WECo 1986). The company must comply with the reclamation and the specific permit stipulations regarding vegetation as shown in appendix 4.

Wildlife mitigation measures approved as part of the permit include providing inanimate features such as boulders, dead trees, electric power lines and other transmission lines designed and constructed to protect raptors. Reclamation practices are designed to enhance wildlife habitat. Mining practices are designed to minimize wildlife impacts (access, haul road locations). Specific habitat reclamation measures and plans are addressed and shown in the Permit - Volumes 2 and 11 - Exhibit C (WECo 1986). It should be noted that several areas were deleted in Area C from mining because of the important wildlife habitat (a sandstone outcrop known as "Eagle Rock" and 113 acres along the West Fork of Armells Creek in T. 1 N., R. 38 E., section 1).

Planting of trees during reclamation

MITIGATION MEASURES

Paleontological resource impacts and approved mitigation measures are covered as special coal lease stipulations in appendix 3.

Cultural resource impacts and approved mitigation measures are covered as special coal stipulations and the special permit stipulations shown in appendixes 3 and 4, respectively.

Traditional lifeway value impacts and approved mitigation measures are covered as special coal lease stipulations in appendix 3. Additional mitigation measures for the Preferred alternative that would be included as special coal lease permit stipulations to protect traditional lifeway values are:

1. No mining or mining-related disturbance on federal coal lands shall be permitted within 160 feet of the Lovelace Memorial and the Petro City cultural property sites.

2. Native trees will be planted in and around the 160-foot buffer zone at the Lovelace Memorial and the Petro City cultural property sites.

Traditionalists within the tribes believe that the spirits associated with these cultural property sites are already adversely affected by the dust, noise, and mining in the area. Destruction of the sites by mining will permanently destroy the spiritual environment and simply cannot be mitigated. They believe that the only respectful treatment and acceptable mitigation is to preserve the sites by avoiding them.

The first mitigation measure would preserve the two cultural properties, the Lovelace Memorial and Petro City sites, by leaving a 160-foot buffer zone around the sites. The 160-foot buffer zone would substantially reduce the amount of coal that is left in-place. Using a 160-foot buffer zone reduces the acreage to 10.58 acres and the tonnage to 452,000 tons of coal left in-place after mining. The second mitigation measure would protect the sites by screening them from the min-

ing-related activities and road which would intrude upon the viewshed and audible environment of the sites.

CUMULATIVE IMPACTS

Total coal production for the Powder River Coal Production Region in 1991 was 211.1 million tons of coal, with the Wyoming portion of the basin producing 173.3 million tons and the Montana portion producing 37.8 million tons (USDI, BLM 1993b). There are currently six operating coal mines (greater than 1 million tons production) in Montana: Absaloka, Big Sky, East Decker, West Decker, Spring Creek, and Rosebud. WECo produces approximately 13 to 14 million tons of coal annually of which 6 to 7 million tons of coal are produced and dedicated to Colstrip generating plants 3 and 4 (appendix 6). The Rosebud Mine accounts for 35 to 40 percent of the coal produced in Montana.

The company has eight federal coal leases involving 17,076 acres, as well as private and state leases. There are 22,490 acres permitted for all areas in the mine and 9,444 acres permitted in Area C. To date, approximately 10,039 acres have been disturbed of which 6,473 acres have been backfilled and 4,090 acres are revegetated (WECo 1993). The projected mine life for Area C is through the year 2019. If approved, the prospective lease would not affect the mine life, production or employment in that other coal lands, mostly private and state, would be mined if the lease application is rejected.

The cumulative impact of this coal lease application to the Powder River Coal Production region would be insignificant. Wyoming recently issued four new federal coal leases for 999.1 million tons of recoverable coal and has three more applications pending for 360 million tons, for a total of 1.359 billion tons of coal. The federal coal lands in this application account for 2.5 percent of the additional coal available in the basin market if all the applications are approved. Since WECo currently operates at 6 to 7 percent of the total production of the Powder River Basin market and the federal coal lands in the application would not tend to increase production, the cumulative impact to the Powder River basin market would be insignificant.

The impact to the Montana portion of the Powder River Coal Production Region would be insignificant. In the Resource Management Plan (USDI, BLM 1985), 65.6 billion tons of federal coal reserves were leased (3.4 billion tons) or acceptable for lease consideration (62.2 billion tons). The coal reserves in the application account for 0.06 percent of the available federal coal reserves in the Montana portion of the basin.

Cumulative impacts to the other resources (such as wildlife, vegetation, soils, topography) would be approximately the same with all alternatives as WECo plans to mine approximately the same acreage of other coal lands if the application is disapproved. The company intends to continue mining coal at approximately the existing rate of production so these resources would experience the impacts regardless of BLM's decision on this coal lease application. Given the surface disturbance of approximately 1,316 additional acres for these lands, the impacts would be insignificant. With the reclamation success demonstrated by the company, the impacts to these other resources would be short-term losses and would occur over time because of the checkerboard ownership pattern and the various stages of mining and reclamation.

Of the five cultural resource sites identified on the lease-by-application tracts, two sites were determined not eligible for the National Register, two sites are outside of the area of mining disturbance, and the remaining eligible site will be mitigated prior to disturbance. The cumulative impact to cultural resources would be insignificant.

IRREVERSIBLE AND IRRETRIEVABLE IMPACTS

Despite proper reclamation efforts and incorporation of mitigation measures to offset mining impacts, there will be residual impacts from mining that will remain long term. There will be 35.1 million tons of coal removed from the Rosebud coal seam that would be irretrievably and irreversibly lost as a resource for future generations. The McKay coal seam would not be mined because of the coal quality problems and would probably be lost as a future resource. The removal of this coal would create permanent topographic changes. The post-reclamation lands would tend to be lower in elevation and flatter than the original landscape, although the lands would approximate the premining topography.

After reclamation, there would be a loss of croplands as these lands would be reclaimed to rangelands, unless the private surface landowner converted reclaimed rangelands to cropland. There would be some long-term degradation of the groundwater as mining will increase the total dissolved solids for the Rosebud coal seam aquifer in the area. There would also be some residual impacts to the spiritual values of the area if these lands are mined.

Chapter 5

CONSULTATION AND COORDINATION

CHAPTER 5
CONSULTATION AND COORDINATION

INTRODUCTION

The WECo Coal Lease Application Environmental Impact Statement was prepared by specialists from the Powder River Resource Area, Miles City District Office, and Montana State Office. The following skills and disciplines were used in the development of the document: wildlife, vegetation and range, geology and minerals, lands and realty, recreation, sociology, economics, cultural resources, hydrology, soils, graphics, typing, editing, and printing. The Montana Bureau of Mines and Geology and WECo provided hydrology support. The Montana Department of State Lands and the U.S. Office of Surface Mining Reclamation and enforcement were cooperating agencies for the project and provided technical reviews of the preliminary documents. Preparation of this amendment began with the public notice printed in the *Federal Register*, Volume 58, No. 32, dated February 19, 1993.

PUBLIC INVOLVEMENT

The public participation process was initiated shortly after the receipt of the coal lease application. A *Federal Register* notice acknowledging receipt of the coal lease application was published February 14, 1992. At the June 15, 1992, meeting of the Powder River Regional Coal Team, approval was given to proceed with processing the coal lease application by the lease-by-application method.

During July and August 1992 scoping meetings were held in Colstrip, Lame Deer, and Hardin, Montana. On February 3, 1993, the Miles City District Manager and Montana Associate State Director made the decision to prepare an environmental impact statement. Concerns expressed by the public at the scoping meetings were considered and analyzed in the draft environmental impact statement.

Additional comments regarding the concerns of Native Americans were solicited through meetings with private individuals and interviews as part of an ethnographic contract to assess cultural impacts in the area of the lease application.

The draft environmental impact statement was issued February 18, 1994. The public comment period ran through April 25, 1994. During that time public meetings were held in Lame Deer and Colstrip, Montana, on March 7 and 8, 1994, respectively. A meeting with the Rosebud Chapter of the Northern Plains Resource Council was held in the Colstrip area on March 15, 1994. Eight letters and one phone call were received with comments on the draft document. Responses to these are presented later in this chapter.

The U.S. Office of Surface Mining Reclamation and Enforcement and the Montana Department of State Lands were invited to participate and are the cooperating agencies on the environmental impact statement.

Consistency

BLM coordinated this action with other federal and state agencies and organizations to insure that the environmental impact statement and other aspects of the project were consistent with their plans, policies, and objectives. Local government and groups were also consulted to insure their awareness of the environmental impact statement and project.

The Montana Governor's Clearinghouse was supplied copies of the environmental impact statement for notification of availability and review by the various state agencies to insure consistency with state plans and objectives. Native American tribes were consulted regarding American Indian Religious Freedom Act concerns, and the U.S. Fish and Wildlife Service was consulted regarding threatened and endangered species concerns.

Distribution List

This environmental impact statement was sent to private industries, businesses, special interest groups, Native American tribes, many interested individuals and federal, state, and local agencies who expressed interest in coal development in the area or the project. The environmental impact statement is available for review at the BLM Montana State Office, Miles City District Office, and Powder River Resource Area as well as public libraries in and around the project area. The environmental impact statement was distributed to the agencies, organizations, and individuals listed below.

CONGRESSIONAL OFFICES

Congressman Pat Williams
Senator Max Baucus
Senator Conrad Burns

FEDERAL AGENCIES

Advisory Council on Historic Preservation
Environmental Protection Agency
Minerals Management Service
Office of Solicitor
U.S. Army Corps of Engineers
U.S. Department of the Army
U.S. Department of Justice
U.S. Fish and Wildlife Service
U.S. Geological Survey
USDA. Forest Service
USDA, Soil Conservation Service
USDI, Bureau of Indian Affairs
USDI, Bureau of Land Management
USDI, Bureau of Mines
USDI, Bureau of Reclamation
USDI, National Park Service
USDI, Office of Environmental Project Review
USDI, Office of Surface Mining Reclamation and Enforcement

INDUSTRY AND BUSINESS

Amax Coal Co.
American Mining Congress
Amoco Production Company
Arcade Bar and Sporting Goods
Basin Electric Power Cooperative
Battle Mountain Gold
Big Sky Mine
Carter Mining
Chevron USA Inc.
Consolidation Coal Co.
Cyprus Coal Co.
Ethnoscience
Exxon Coal Res USA Inc.
Fergus Electric Cooperative Inc.
First Bank Billings
Genie Land Co.
Glacier Park Co.
Golder Ranch Inc.
Greystone
Health and Marketing West
Horizon Çoal Services Inc.
Horizon Enviro Services Inc.
Hubbard Ranch Inc.
Kiewit Mining Group
Kiewit Sons Co.
Long Construction
Montana Power Company
Montana Royalty Company
Musselshell Valley Development Corporation
North American Coal Corporation
Peabody Coal Company
Picchionis Inc.
Rocker Six Cattle Co.
Rocky Mountain Pay Dirt
Roundup Record Tribune & Winnett Times
Shell Oil Co.
Spring Creek Coal Company
Texaco Inc.
Thermal Energy
Triton Coal Company
Union Pacific Railroad
U.S. Borax and Chemical Corp.
Utah International Inc.
WECo
Wesco Resources
Western Coal Traffic League
Westmoreland Resources
Ziegler Coal Holding Company

INTEREST GROUPS

Central Montana Resource Conservation and Development
Colorado State University
Dull Knife Memorial College
Eastern Montana College
George Grant Chapter of Trout Unlimited
Henry Malley Memorial Library
Little Bighorn Community College
Montana Mining Association
Montana Petroleum Association
Montana Wildlife Federation
National Coal Association
National Wildlife Federation
Native Action
North Dakota State University
Northern Plains Resource Council
Powder River Regional Coal Team
Powder River Basin Resource Council
Public Lands Council
Rocky Mountain Oil and Gas Association
Rosebud County Library
Rosebud Protective Association
Rosebud Treasure Wildlife Association
Roundup Public Schools
Sierra Club
Simmons Rock College

Skyline Sportsmens Association Inc.
University of Montana
Yellowstone County, Superintendent of Schools

INDIVIDUALS

Don Bailey
Alan Baker
Anthony Bear
Wallace Bearchum
Robert Bearchum Jr.
Charles Bearcomesout
Herman Bearcomesout
Quintina Bearcomesout
Floyd Bearing
Larry Beartusk
Arnold Bejot
Dolly Bellrock
Jackie Bement
Duane Bends
Leonard Bends
Paul F. Berg
Kenny Big Back
Milo Bighead
Delbert Big Lake
Michael W. Boback
Robert Brien
Daisy Bright Wings
Carol Ann Bullinsight
Paula Castro
Steve and Jeanne Charter
B C Cheryl
Bill Correl
John Cummings
Burford J. Curly Sr.
Darcy Kay Dahle
Roberta Doser
Scott Doser
Mary Dowlin
Larry A. Drew
Tom Ebzery
Elmer Fighting Bear
Conrad Fisher
Harold Fisher
Ted Fletcher
Daniel Foote
Tom France
H. Paul Friesema
Marla Fritzler
William F. Gillin
Clay Gregory
Michael Grende
Edmund E. Heinle
Marian W. Hanson
Bryan Harris
Langdon Headswift
Donald Hollowbreast
Carol Howe
Misty Renee Kellum
Tonya Kills Night
Louis Killsnight Sr.
James D. King Sr.
Claude Leedow
Melvin Left Hand
Fredrick Lefthand
Herman Limberhand
Eugene Limpy Sr.
Thomas Lion
Annie Joyce Littlebird
Delbert Littlebird Sr.
Harriet Littlebird
Harry Littlebird Sr.
Harry Littlebird III
Rosie Littlebird
Joe Little Coyote Sr.
Alvin Little Light
Bob Little Light
Cornelius Little Light
LaForce Lonebear
Margaret MacDonald
Bob Magpie
Rachel Magpie
Diana R. McLean
Teddy McMakin
Donlin McManus
Malcolm McRae
Wally McRae
Larry Medicine Bull
Lori Medicine Bull
Philinga Mendoya
Robert J. Morehead
Bertha M. Nomee
Cathy Not Afraid
Loren Old Bear
N Mickey Old Coyote
Dan Old Elk
Dale Old Horn
Guy William Parker
William Parker
Charlene Peppers
Louise Pfister
Leroy Pine Sr.
Bill Pittman
Joe H. Rawlins
Chuck Real Bird
Viola Red Bird
Gilbert Redneck Sr.
Robert Redneck
Jerry Red Wolf

George Reed Jr.
Johnny Richards
Ted Risingsun
Charlotte Robinson
Dr. E. P. Robinson Jr.
Charlotte Rockroads
Florence Running Wolf
Michael Running Wolf
Winfield Russell
J. Shon Nikki Rae Sandcrane
Dave Schaenen
Monty L. Sealey
Joann Seminole
Luganna G. Seminole
Rosella Shane
Ruthie Shoulderblade
Danny Sioux
Lorna Sioux
Mabel Small
Joann Sooktis
Rubie Sooktis
Julianne Spang
Phyllis Spang
Lucille Spear
Dan K. Stanley
Alfred Strange Owl
Elaine Strange Owl
Bill Tallbull
Patricia C. Tallbull
Jacklin Tang
Gary G. Thomas
Northey Tretheway
Jennifer A. Tully
Pete R. Tully
Adam Two Two
Joe Wallace
Ike Washington
Viola Washington
Becky Westra
Julie Lynn White Dirt
Patricia White Hip
Frank Whiteman
Jason Whiteman Sr.
Adam Wolf
Shawn Lee Woodenlegs
Alvin Yarlott
Donna Yazzie
Ruben Yellowtail
William P. Yellowtail

LOCAL GOVERNMENT

Big Horn County Commissioners
Big Horn County Planning Board
Bighorn County Public Library
City of Gillette
City of Roundup
Colstrip Bicentennial Library
Custer County Commissioners
Fulmer Public Library, Sheridan, Wyoming
Malley Memorial Library, Broadus, Montana
Musselshell County Commissioners
Parmly Billings Public Library
Powder River County Commissioners
Rosebud County Commissioners
Rosebud County Library
Treasure County Commissioners
Yellowstone County Commissioners

STATE GOVERNMENT

Governor of Montana
Governor of Wyoming
IGR Coordinator
Montana Association of Conservation Districts
Montana Association of Counties
Montana Bureau of Mines and Geology
Montana Coal Board
Montana Coal Bureau
Montana Coal Council
Montana Department of Commerce
Montana Department of Fish, Wildlife and Parks
Montana Department of Health and Environmental Sciences
Montana Department of Highways
Montana Department of Natural Resource and Conservation
Montana Department of Social and Rehabilitation Services
Montana Department of State Lands
Montana Intertribal Policy Board
Montana Legal Services Association
Office of the Governor
Planning Coordinators Office, Wyoming
Representative Robert C. Clark
Representative Marian W. Hanson
Representative Angela Russell
State Historic Preservation Office
State of Montana Office of Public Instruction

TRIBAL GOVERNMENT

Crow Tribal Council
Crow Tribal Council Administration
Northern Cheyenne
Northern Cheyenne Tribal Council

List of Preparers

CORE TEAM

Mary Alice Spencer: Area Manager, Powder River Resource Area. B.A. Social Studies Education, State University of New York at Albany; M.S. Geology, University of Kansas. She has worked for BLM and other federal agencies since 1975.

Bill Matthews: Project Manager, Powder River Resource Area. B.S. Zoology, Clemson University; M.S. Wildlife Biology, Clemson University. He began working for BLM in 1977.

Gloria Gunther: Editorial Assistant, Miles City District Office. Graduate, Custer County High School. She has worked for BLM since 1980.

Debra Sloan: Office Automation Clerk, Big Dry Resource Area. Graduate, Terry High School. She has worked for BLM since 1990.

SUPPORT TEAM

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Dennis Cape: Engineer, Hydrologist, WECo B.S. Mining Engineering, South Dakota School of Mines and Technology. He has worked for WECo since 1989.

Dawn Doran: Range Conservationist, Powder River Resource Area. B.S. Forestry, University of Montana. She has worked for BLM since 1990.

Kathleen Doran: Engineering Supervisor, WECo B.S. Mining Engineering, Montana College of Mineral Science and Technology. She has worked for WECo since 1983.

Chris Hoff: Wildlife Biologist, Powder River Resource Area. B.S. Wildlife Management, Humboldt State University; M.S. Wildlife Management, Humboldt State University. He has worked for BLM since 1976.

Will Hubbell: District Archaeologist, Miles City District Office. B.A. Anthropology, University of Colorado. He has worked for BLM since 1977.

Ed Hughes: Economist/Coal Coordinator, Montana State Office. B.S. Mineral Economics, The Pennsylvania State University. He has worked for BLM from 1974 to 1982 and from 1989 to present.

Pam Loomis: Realty Specialist, Powder River Resource Area. Secretarial Degree (two years); Miles Community College. She has worked for BLM since 1974.

Pete Mellbom: Hydrologist, WECo B.S. Forestry, University of Montana. He has worked for WECo since 1979.

Robert Mitchell: District Soils Scientist, Miles City District Office. B.S. Geology, University of Wyoming; M.S. Soil Science, University of Wyoming. He has worked for BLM and other federal agencies since 1987.

Jon Reiten: B.S. Geology and M.S. Geology, University of North Dakota, Grand Forks, North Dakota. He worked for the North Dakota State Water Commission as a hydrologist for five years and has worked as a hydrogeologist for the Montana Bureau of Mines and Geology since 1985.

John Spencer: Geologist, Montana State Office. B. S. Geology, University of California; M.S. Earth Science, Iowa State University. He has worked for BLM and other federal agencies since 1974.

Joan Trent: Sociologist, Montana State Office. B.A. Psychology, Miami (Ohio) University; M.A. Environmental Science, Miami (Ohio) University. She has worked for BLM since 1979.

CONTRIBUTORS

Jim Beaver
Gary Smith
Printing and Graphics Staff
Cartographic Staff

PUBLIC REVIEW OF THE DRAFT EIS

Availability of the draft environmental impact statement was filed with the Environmental Protection Agency and announced in the *Federal Register* on February 18, 1992. Copies of the draft environmental impact statement were mailed to federal, state, and local governments; private groups and organizations; and individuals for review and comment. News releases provided information on how to obtain copies of the draft environmental impact statement. Public meetings were held on March 7, 1994, at Lame Deer, Montana, and March 8, 1994, in Colstrip, Montana. A BLM offical presided over each meeting. A total of 9 comments were received during the 60-day comment period. Responses to these comment letters are provided in this chapter.

Comment Letters

1.	Patty Kluver	Route 1, Box 2046	Forsyth, Montana 59327
2.	State Historic Preservation Office PO Box 201202	1410 8th Avenue	Helena, Montana 59620-1202
3.	Bureau of Indian Affairs	316 North 26th Street	Billings, Montana 59101
4.	H. Paul Friesma, Professor Center for Urban Affairs and Policy Northwestern University	2040 Sheridan Road	Evanston, Illinois 60208-4100
5.	Western Energy Company	PO Box 99	Colstrip, Montana 59323
6.	Environmental Protection Agency	Federal Building 301 S. Park, Drawer 10096	Helena, Montana 59626-0096
7.	Native Action	P.O. Box 316	Lame Deer, Montana 59043
8.	Montana Department of Transportation	2701 Prospect Avenue PO Box 201001	Helena, Montana 59620-1001
9.	Department of the Army	215 North 17th Street	Omaha, Nebraska 68102-4978

The letters received during the comment period are reprinted in this chapter. The numbered bracketing in the left hand margins correspond with the appropriate response. Responses to the written comments follow the letters.

1

From: Marilyn K. Krause (MKRAUSE)
To: MT024:MSPENCER
Date: Thursday, February 10, 1994 3:59 pm
Subject: WECO Comment

1-1 Mary Alice, I just visited with a person on the phone that wanted to submit a comment on the Western Energy EIS so I will pass it o to you.
Ms. Patty Kluver, Rte 1, Box 2046, Forsyth MT 59327, phone 347-55
There is a mistake on the map on page 3; in Sec 12, T2N R39E it shows a 40 acre parcel as public lands which Ms. Kluver says is n private - purchased by her sister Mary Dowlin several years ago & they would like the map corrected.

State Historic Preservation Office
Montana Historical Society
1410 8th Avenue • PO Box 201202 • Helena, MT 59620-1202 • (406) 444-7715

2

February 23, 1994

Bill Matthews
BLM-Powder River Resource Area
Miles City Plaza
Miles City, MT 59301

Re : Draft EIS Western Energy Company Coal Lease Application (MTM-80697)

Dear Mr. Matthews:

Thank you for providing our office an opportunity to review the Draft EIS for the above referenced proposed coal lease. We have several general comments to make at this time. We note that the EIS document states that the BLM is the lead agency in reviewing the proposed action for NEPA compliance and that cultural resource concerns form a substantial portion of the resource issues at hand.

2-1 We agree that consideration of cultural resources, particularly TCP issues, should be resolved prior to the sale of proposed leases, but also believe that because leases often constrain federal discretion that such actions should be considered undertakings under the National Historic Preservation Act Section 106 (amended 1992), and that an accounting of possible effects to cultural resources should be addressed as part of the 36CFR800 process. We find no evidence of having received for review and comment under 36CFR800 the Kooistra-Manning 1993 Ethnographic Overview which apparently forms the basis of BLM TCP assessments of 24RB301, 24RB302, 24RB310, 24RB883, and 24RB975.

Two sites, 24RB301 and 24RB302, are described as likely eligible for listing in the National Register for Historic Places as significant Traditional Cultural Properties. However, we are unaware of any formal determination of eligibility having been made in consultation with MT SHPO or the Keeper regarding any of these sites as possible TCPs. Discussion of effect and possible mitigation are premature without 36CFR800 consultation regarding eligibility.

Further, we believe that it would be appropriate for the BLM to review the adequacy of cultural resource inventories dating from 1979, 1980, and 1986. We have concerns about relying on dated inventories: just as federal standards for Air Quality have changed, so have significance assessments of certain sorts of archaeological sites, eg., historic landscapes and TCPs. Additionally, natural processes such as erosion may have exposed previously subsurface sites within the last ten years.

February 23, 1994
Page 2

The EIS states that MT SHPO, WECo. and DSL are consulting concerning appropriate mitigation of the Castle Rock Post Office (24RB335). We have concurred on the eligibility of this site but have located no current mitigation proposal. Once the eligibility of all sites in the Potential Area of Effect has been resolved, findings of effect can be addressed in consultation with MT SHPO, BLM, OSM, DSL, and the ACHP as appropriate.

We anticipate 36CFR800 consultation with the BLM and OSM regarding this undertaking and would like the opportunity to comment on the Kooistra-Manning Report as soon as possible.

Sincerely,

Stan Wilmoth, Ph.D.
Archaeologist

File: BLM/Miles City/1994
OSM/WECO AREA C/1994-
CD/24RB335

cc: Will Hubble/Miles City BLM
Gary Smith/State Office BLM

BLM Library
Denver Federal Center
Bldg. 85, OC-521
P.O. Box 25047
Denver, CO 80225

3

United States Department of the Interior

BUREAU OF INDIAN AFFAIRS
Billings Area Office
316 North 26th St.
Billings, Montana 59101

IN REPLY REFER TO:

Land and Minerals
Code 360

MAR 10 1994

MEMORANDUM

TO: Area Manager, Powder River Resource Area
Bureau of Land Management, Miles City, Montana

FROM: Area Director, Billings Area

SUBJECT: Western Energy Company Coal Lease Application
Environmental Impact Statement (EIS)

This office has taken the opportunity to review the subject EIS. It appears to be a very well compiled document. The interdisciplinary team which developed it deserves recognition. One issue which we are glad you addressed is that of cultural resources. My staff attended many of the scoping sessions and did not hear much input from the attendees regarding this subject. Nonetheless, the team did a fine job of investigating the issue and evaluating the possibilities.

3-1 We strongly suggest that you attempt to secure more Indian input related to the traditional cultural properties and sites with intangible spiritual attributes. Through consultation with more than a few tribal members, on this subject, you will be in a position to make an informed decision which is in the general public's best interest.

3-2 This input will allow you to consider the following. Based upon preliminary calculations, it appears that more than 8.7 million dollars in royalty will be foregone by the United States Government (Government) if the 40 and 30 acre aliquot parts surrounding the cultural properties are not mined. Leaving the 160 feet wide unmined "buffers" around the Lovelace Memorial and the Petro City cultural property sites also is costly. It appears that over $888,000 dollars in royalty to the Government will be foregone if that proposed mitigation measure is employed.

3-3 Using these numbers, your office also needs to consider the unique attributes of these sites and accessibility for spiritual purposes. If the petroglyph sites are indeed very significant and accessible to the Indian people for spiritual use, you will have to weigh that significance against the financial considerations involved with bypassing the coal beneath them.

Since this is not a draft document, the remaining comments may be irrelevant. However, if it becomes necessary to re-examine this issue, you may wish to correct the following:

3-4 Appendix 4, page 59, column 2, paragraph 1, final sentence should read "There will be no permanent hydraulic structures left as a result of mining operations."

Appendix 9, page 109, Section 26.4.318, paragraph 3, final sentence should read ". . .(Insite), 24RB878 (Foresite), 24RB1058 (Farley Lookout), and . . ."

Questions may be directed to Mr. Richard J. Stefanic at 406/657-6145.

Center for Urban Affairs
and Policy Research
NORTHWESTERN UNIVERSITY

4 Mary Alice Spencer, Area Manager
Powder River Resource Area, BLM
Miles City District
Miles City, MT 59301-2844

March 21, 1994

Dear Mary Alice Spencer:

I am reviewing the DEIS on Western Energy & Coal Lease Application (MTM-80197)

4-1 Why didn't you choose the so-called Cultural Resource Avoidance alternative as the preferred alternative? That is what you are now suggesting.

Please send me a copy of the Ethnoscience report (Knudson-Manny, et al - 1993) and also the report on the nomination of the two sites as eligible for the National Register of Historic Places. On page 4 of the DEIS you say that sites that were eligible if it had, that are could still be closed for steps may. How can that be?

Thank for you help and attention.

Sincerely,

H. Paul Friesema
Professor

H. PAUL FRIESEMA

WESTERN ENERGY COMPANY

P.O. BOX 99 / COLSTRIP, MONTANA 59323 / (406) 748-5100

April 22, 1994 FEDERAL EXPRESS

Ms. Mary Alice Spencer
Bureau of Land Management
Powder River Resource Area
Miles City Plaza
Miles City, MT 59301-2844

RE: Federal Coal Lease Application MTM-80697

Dear Ms. Spencer,

5-1 Enclosed are two maps prepared by Western Energy in response to the January 1994 DRAFT Environmental Impact Statement. Western has prepared our analysis using alternative number one (1) presented on page 42 of the draft EIS. The first paragraph on page 43 mentions that "using a 160 foot buffer zone reduces the acreage to 14.86 acres and the tonnage to 658,000 tons of coal left in-place after mining"; Western's analysis estimates 308,000 tons of coal left in-place after mining.

Attached is a summary prepared by WECo Engineers detailing the impact of the bypassed coal in Section 32. The additional mining costs of this alternative are estimated at $457,000.00. Also attached is a comment form prepared for the original draft, that was omitted in our last transmittal to you.

I enjoyed meeting you at the public hearings. If you have any questions, please do not hesitate to contact me at (406) 748-5222.

Sincerely,

Carol A. Matter
Contract Analyst II

Enclosure
PC: Tom Rossetto
Leo Doran
jam/169/0235

SEC. 32 CULTURAL SITES	AREA C	D. NEGETHON 4-19-92

SUMMARY

BYPASSED COAL IMPACT:

	TONS	S.R.
LOVELACE MEMORIAL	174,600	2.94
PETRO CITY	134,000	2.97
TOTAL	308,600	2.95

ADDITIONAL DRAGLINE OVERBURDEN IMPACT:

	YDS³	RATE	COST
LOVELACE MEMORIAL	268,100	0.35	$93,800
PETRO CITY	170,100	0.35	59,500
TOTAL	438,200	0.35	$153,300

AUXILIARY EQUIPMENT OVERBURDEN IMPACT:

	YDS³	RATE	COST
LOVELACE MEMORIAL	132,200	0.75	99,200
PETRO CITY	124,800	0.75	93,600
TOTAL	257,000	0.75	$192,800

MOBILIZATION IMPACT:

	LENGTH	DL. HRS.	RATE	COST
PASS 5	3400'	9.3	$500	$4650
PASS 6	17,000'	46.6	500	23,300
PASS 7	12,400'	34.0	500	17,000
TOTAL	32,800	89.9	500	$44,950

ENDWALL IMPACT: *(DRAGLINE PROD. DECREASE)

	EA.	COST/EA.	COST
PASS 2	1	$6000	$6000
PASS 3	1	6000	6000
PASS 4	1	6000	6000
PASS 5	2	6000	12,000
PASS 6	4	6000	24,000
PASS 7	2	6000	12,000
TOTAL	11	6,000	$66,000

* ASSUME 50% DRAGLINE PROD. FROM 90° BENCH FOR 3 SHIFTS TO DIG ENDWALL ∴ IMPACT APPROX. EQUALS $250/HR. X 3 SHIFTS. ± 6000/ENDWALL

22-141 50 SHEETS
22-142 100 SHEETS
22-144 200 SHEETS
AMPAD

SEC. 32 CULTURAL SITES	AREA C	D. NEGETHON 4-19-92

COMPS.

ADDITIONAL OVERBURDEN CREATED @ ENDWALLS & HIGHWALLS AROUND SITES :

LOVELACE MEMORIAL

OUTER POLYGON - 513,989 yd^3
INNER POLYGON - 245,925

ADD'L OVB. 268,064 yd^3

PETRO CITY

OUTER POLYGON - 398,508 yd^3
INNER POLYGON - 228,434

ADD'L OVB. 170,074 yd^3

AUXILIARY EQUIPMENT OVERBURDEN CREATED AT BACKSIDE OF SITES

LOVELACE MEMORIAL - 132,232 yd^3

PETRO CITY - 124,828 yd^3

22-142 100 SHEETS
22-144 200 SHEETS
AMPAD

Bench Volumes AUXILIARY OVERBURDEN DUE TO BYPASS

1) base: CRB.SRG 2) bench: CRB.SRG+90 3) limit: CTOPO.TPG

Polygon	pol ac.	bench	yards	exp ac.	feet	swell
LL_AUX_OVB	1.334	1	132232	1.306	61.433	1.000
		2	0	0.028	0.000	1.000
Total		all	132232	1.334	61.433	1.000

1) base: CRB.SRG 2) bench: CRB.SRG+90 3) limit: CTOPO.TPG

Polygon	pol ac.	bench	yards	exp ac.	feet	swell
PC_AUX_OVB	0.789	1	114514	0.000	89.924	1.000
		2	10313	0.789	8.099	1.000
Total		all	124828	0.789	98.023	1.000

Bench Volumes — INNER POLYGONS

1) base: CRB.SRG 2) bench: CRB.SRG+90 3) limit: CTOPO.TPG

Polygon	pol ac.	bench	yards	exp ac.	feet	swell
LOVELACE	1.842	1	245924	1.506	82.776	1.000
		2	0	0.336	0.000	1.000
Total		all	245925	1.842	82.776	1.000

1) base: CRB.SRG 2) bench: CRB.SRG+90 3) limit: CTOPO.TPG

Polygon	pol ac.	bench	yards	exp ac.	feet	swell
PETRO_CITY	1.842	1	227807	1.588	76.677	1.000
		2	627	0.253	0.211	1.000
Total		all	228434	1.842	76.889	1.000

TOTAL TONS BYPASSED

Reserves (status: + points masked, * points beyond grid) —

Polygon	yards	acres	feet	tonnage	recv %	status
LOVELACE	161644	3.948	25.379	174576	100.000	ok
PETRO_CITY	124089	3.231	23.804	134016	100.000	ok

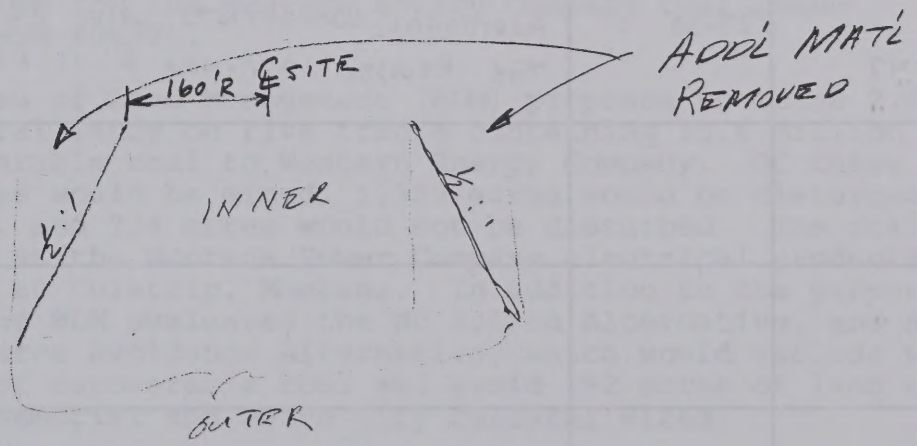
Bench Volumes — OUTER POLYGONS

1) base: CRB.SRG 2) bench: CRB.SRG+90 3) limit: CTOPO.TPG

Polygon	pol ac.	bench	yards	exp ac.	feet	swell
LOVELACE	3.948	1	513988	3.944	80.699	1.000
		2	0	0.004	0.000	1.000
Total		all	513989	3.948	80.699	1.000

1) base: CRB.SRG 2) bench: CRB.SRG+90 3) limit: CTOPO.TPG

Polygon	pol ac.	bench	yards	exp ac.	feet	swell
PETRO_CITY	3.231	1	395370	2.571	75.843	1.000
		2	3137	0.661	0.602	1.000
Total		all	398508	3.231	76.444	1.000



COMMENT FORM FOR WESTERN ENERGY COMPANY EIS

RECEIVED
OCT 18 1993
Ans'd.....

Reviewer: O. CAPE W/ECO

Section	Page No.	Line No.	Comment and Suggested Revision
h4	47	42	"DOMESTIC USE" TO "DOMESTIC USE (EXCLUDING DRINKING WATER)"
h4	47	39	"IN MANY CASES" TO "IN SOME CASES"
h4	47	21	"STUDIES HAVE SHOWN" TO "STUDIES (VAN VOET 1978) HAVE SHOWN"
h4	47	24	"HUNDRIDS" TO "THOUSANDS"
h4	47	27-33	ADDITIONAL COMMENTS WILL BE PROVIDED WHEN THE REVISED APPENDIX 8 IS AVAILABLE

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VIII, MONTANA OFFICE
FEDERAL BUILDING, 301 S. PARK, DRAWER 10096
HELENA, MONTANA 59626-0096

6

Ref: 8MO

April 25, 1994

Mr. Bill Matthews, Project Manager
Bureau of Land Management
Powder River Resource Area
Miles City Plaza
Miles City, Montana 59301-2844

Re: Draft Environmental Impact Statement for Western Energy Company Coal Lease Application (MTM-80697)

Dear Mr. Matthews:

In accordance with our responsibilities under the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act, the Environmental Protection Agency, Region VIII, Montana Office (EPA) has reviewed the Draft Environmental Impact Statement (DEIS) for the Western Energy Company Coal Lease Application (MTM-80697).

The Bureau of Land Management (BLM) proposes to lease 2,061 acres of federal lands on five tracts containing 35.6 million tons of recoverable coal to Western Energy Company. Of these lands 914 acres would be mined, 1,327 acres would be disturbed during mining, and 734 acres would not be disturbed. The coal would be used at the Montana Power Company electrical production units 3 and 4 at Colstrip, Montana. In addition to the proposed alternative the BLM evaluated the No Action Alternative, and a Cultural Resource Avoidance Alternative, which would exclude 6.5 million tons of recoverable coal and avoid 152 acres of land at the Lovelace Memorial and Petro City cultural sites.

The following comments are offered for your consideration in preparing the Final EIS.

6-1 1) The air quality impact analysis in the DEIS is confusing. On page 16 of the DEIS it is stated, "Because of the high concentrations of total suspended particulates (TSP), the air quality in the Colstrip area does not meet the Montana and National Ambient Air Quality Standards." The EIS indicates that a 120 square-mile area was designated non-attainment for TSP in 1986. Subsequently, those standards were replaced by PM-10

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standards. The DEIS goes on to state that the only lands in the application within the nonattainment area are those lands in Section 14, T1N, R40E.

The Final EIS should clearly:

a) disclose the current applicable numeric standards and identify the status and location(s) of nonattainment area(s) relative to the proposed coal lease areas on a map;

b) describe the status of and relationship of the air quality impacts analysis to the Montana State Implementation Plan (SIP).

6-1

c) summarize and disclose Western Energy Company air quality monitoring data from the Rosebud Mine (Montana Air Quality Bureau permit 1570A).

d) discuss whether there is requirement to apply for either a new or amended permit for the expanded mine.

e) describe the basis for concluding (page 33) that air quality impacts to the Colstrip area would not be significantly affected. Given the area's nonattainment status, it is not apparent whether air screening modeling has been performed to determine incremental PM-10 impacts to the non-attainment area.

2) The purpose of Table 3.14 on page 32 is unclear. What are the standards that resource data are being compared to? More pertinent information to the environmental impact analysis should be provided to reveal meaningful resource (e.g., ground water, surface water, and air quality) data analyses and comparisons to the standards. Applicable Federal, State, and local environmental standards and requirements should be clearly described, and compliance with such standards should be discussed.

6-2

3) We are concerned about the potential for poor water quality moving into the deeper aquifers that are being depended on to replace mined out water supplies. The discussion of hydrologic impacts in Appendix 8 of the DEIS seems to contradict the discussion of ground water impacts on pages 35 and 36 of Chapter 4. For example, it is stated in Appendix 8 (page 93) that McKay and sub-McKay aquifer impacts are greater than previously predicted, and that the hydraulic connection indicates a potential for poor quality water moving into deeper aquifers. This seems to be contrary to the statement (page 36) that aquifers below the McKay aquifer are "unlikely to experience any measurable increase in total dissolved solids"? These contradictions should be clarified and/or explained in the FEIS. Also, it appears inappropriate to us to continue to refer to the sub-McKay sandstone aquifer as the proposed source of post-mining domestic/stock water (page 36) if continued

6-3

degradation of the water quality in this aquifer is expected (Appendix 8).

6-4 4) We are concerned about the hydrologic impact discussions in Appendix 8 that suggests "significant degradation of spoils water from pre-mining water quality", and "serious impacts to deeper unmined aquifers". Is there any expectation for the water trapped within the spoil aquifer to eventually re-enter the regional flow pattern? If so what effect will it have on the general water quality in the flow system, and has material damage to the hydrologic balance outside the permit area been prevented? What mechanism is in place to compensate an injured well owner in light of impacts to the proposed alternative water source?

6-5 5) It is stated on page 96 that "temporary" disruptions in streamflows will occur in stream reaches that either are mined out or are adjacent to the mined pits, and that these disruptions will be minimized when stream channels are reconstructed. When will stream channels be reconstructed? What is proposed to mitigate the temporary loss of the functions and values of these impacted streams and riparian areas?

6-6 6) Wetlands within the analysis area including acreage, type, and ecological function and value should be identified and described in Chapter 3. If there are no wetlands in the analysis area this should be clearly stated in Chapter 3. The effects of the proposed activities upon the functions and values of area wetlands should be evaluated and disclosed in Chapter 4 (including temporary wetlands losses and wetlands losses due to water table drawdowns). Unavoidable adverse impacts to wetlands, occurring from implementation of the proposed alternative, should be mitigated to achieve our Nation's goal of no net loss of wetlands functions and values.

6-7 7) The cumulative impact analysis in the DEIS is inadequate. We suggest that you obtain a copy of the West Rocky Butte Coal Lease Application EIS (BLM Casper, Wyoming District Office), which provides an improved cumulative impacts analysis model.

Based on the procedures EPA uses to evaluate the adequacy of the information in the EIS and the environmental impacts of the proposed action and alternatives, the Draft Environmental Impact Statement (DEIS) for the Western Energy Company Coal Lease Application will be listed in the Federal Register in category EC-2 (environmental concerns, insufficient information). This category indicates that EPA has identified areas of potential impacts, specifically concerning the preservation of air quality and groundwater quality, which should be avoided in order to fully protect the environment. Also, the EIS requires resource information in order to fully assess environmental impacts that should be avoided.

The EPA appreciates the opportunity to review and comment on the Draft EIS. If we may provide further explanation of our concerns, please contact Mr. Steve Potts at (406) 449-5486 ext. 232.

Sincerely,

William E. Rigby

for John H. Wardell, Director
Montana Operations Office

cc: Bud Clinch, Director, Montana Dept. of State Lands, Helena
John Thompson, NEPA Coordinator, BLM, Billings
Tim Bozorth, Regional Hydrologist, BLM, Billings
Jason Whiteman, Northern Cheyenne Reservation, Lame Deer
Myron Falls Down, Crow Reservation, Crow Agency
John Arrigo, Montana Water Quality Bureau, Helena
Jeff Chaffee/Pat Driscoll, Montana Air Quality Bureau, Helena
Bob DeSpain/Phyllis Williams, EPA, Denver, 8WM-EA
Larry Kimmel, EPA, Denver, 8WM-EA
Bill Monheiser, EPA, Denver, 8WM-GW

7

NATIVE ACTION
P.O. BOX 316
LAME DEER, MT 59043
PH. (406) 477-6390
(406) 477-6537
FAX (406) 477-6421

April 22, 1994

Ms. Deb Sloan,
Resource Assistant
Bureau of Land Management
Powder River Resource Area
Miles City Plaza
Miles City, MT 59301

Dear Deb,

Enclosed please find the comments for the Draft Western Energy Co. Coal Lease Application (MTM-80697).

We would appreciate it if your office would keep us informed of the status of this application. Thank you.

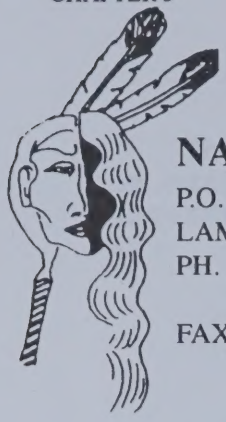
Sincerely,

Gail Small / lh

Gail Small,
Executive Director

GS/lh

enclosure



NATIVE ACTION
P.O. BOX 316
LAME DEER, MT 59043
PH. (406) 477-6390
(406) 477-6537
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COMMENTS ON

DRAFT WESTERN ENERGY CO. COAL LEASE APPLICATION (MTM-80697) ENVIRONMENTAL IMPACT STATEMENT

1. INTRODUCTION

An EIS is an important document. It informs decisionmakers, whose impending actions will affect people's lives both directly and through impacts on the environments in which people live. The EIS makes information available to decisionmakers about the likely or possible affects of their actions. It also informs the public of these likely affects. This "public" includes people who may be interested in the environmental, historical, or cultural values of the affected area in a general way; and it also includes the peoples who live in the area and whose lives will be directly affected. This information obviously is critically important for both the decisionmakers and the affected public. The legislatively mandated responsibilities of researching, analyzing and presenting this information in a readable and useful form should be taken seriously.

This Draft EIS does address some of the cultural, social, economic,a nd environmental issues of concern to the Northern Cheyenne Tribe. But it does not do so in ways that respect the importance of the issues, that give a balanced picture of the values affected, nor that meet the legislative and regulatory purposes of an EIS as defined above. To meet those requirements, this EIS must present state-of-the-art understandings of the issues involved in a balanced, clear, professional manner.

2. CULTURAL CONCERNS

a. Traditional Cultural Properties & National Register Criteria.

7-1 The discussions of cultural sites in Chapters 3 and 4 are unclear and confusing. The term, *"Traditional Cultural Property"* has specific semi-technical meanings which are spelled out in National Park Service documents (especially Bulletins #s 38 and 16 with reference to Bul. # 38). The term is used loosely in the EIS, however, and is never defined or even referenced.

The EIS refers for instance to sites that are "eligible for the National Register as Traditional cultural Properties under criterion [sic] A and C..." (p. 25, Col 2). But the authors

never define the terms not the criteria they refer to, nor does the EIS even list the pertinent source references in the bibliography. The non-specialist decisionmaker or citizen reader is left completely at a loss. In the same discussion, the EIS refers to "traditional cultural properties," "contemporary use areas," "sites with intangible spiritual attributes" and so on, in ways that are more confusing that informative.

7-2

The authors know little or nothing about this field of research and law. Therefore they cannot communicate the issues and values at stake clearly and informatively. The EIS addresses these issues; but does so in ways that slight them rather than take them seriously as they deserve. The discussion obscures the fundamental issues more than it informs the reader of their importance. It is not the "state-of-the-art" presentation that is mandated. Apparently the actual authors of the EIS who wrote these sections simply pulled terms and concepts from their consultants' reports and inserted them into the draft EIS. It is not clear that the authors themselves understood the concepts involved, and therefore they do not communicate effectively to a wide readership. BLM needs to take these kinds of issues seriously and to assign qualified people to its core EIS staff to deal with them. Their treatment is this EIS slights not only the issues, but also the peoples whose actual lives will be affected.

7-3

b. Cumulative Impacts.

The discussion of cumulative impacts in this EIS is misleading. The EIS argues that the cumulative impacts of the proposed action in all areas would be "insignificant." It argues, in particular, that "as only five sites were identified...the cumulative impact to cultural resources would be insignificant" (p. 43). The EIS analysis slights the real issues and biases the presentation in favor of the proposed action.

7-4

Basically, the EIS analysis assumes that because there are only a few cultural sites that will be destroyed, or the mine disturbs only 1,300 acres or represents only a fraction of the local coal market, the "cumulative" impacts will be insignificant in these areas. The cumulative impact analysis is not supposed to consider just the incremental impact of this particular decision in isolation, however. It is supposed to look at the cumulative effects of this decision in the context of all the other similar relatively small or large actions that may be occurring in the area.

7-5

The requirement for a cumulative impact analysis is supposed to make the agency consider not just the effects of this particular decision in isolation, but how the effects of all such decisions add up to affect the people's lives. By translating cumulative impact to incremental impact, the EIS is able to trivialize the effects of this decision, and is able to avoid confronting the decisionmaker and the public with the very problems that the cumulative analysis is supposed to raise.

To illustrate this point, an issue raised way back in Chapter 3 describing the "affected environment" truly is relevant to the issue of cumulative impact. The EIS notes that Northern Cheyenne

7-6

> "Elders are concerned that coal development is disrupting and will continue to disrupt the spiritual environment, destroy cultural resources and endanger plant and animal habitats. ... This loss is particularly difficult for the old people" (p. 26, Col. 1).

These kinds of concerns are precisely about the very real cumulative impacts of coal development in the area. These kinds of questions need to be confronted as impacts and not be hidden in the "existing environment" section of the EIS. In this "cumulative" context, the incremental destruction of "only" five more religious or traditional sites should not be so easily slighted as "insignificant".

3. SOCIAL AND ECONOMIC IMPACTS

Similar issues to those raised above also occur in the analysis of social and economic impacts in Chapters 3 and 4 of the EIS. The EIS for this action needs to assess the contributions of this action to the serious disparities of income and employment documented in Chapter 3 (pp. 28-31), for instance. Because this proposed action represents a continuation of existing mining and alternative mining might occur anyway, the EIS suggests that this action will have little or no impacts in a wide range of significant areas.

7-7

But an agency, through its EIS process, is supposed to take a hard look at impacts from the proposed action in question. This strategy of assuming that other lands will be mined anyway if this permit is disapproved or modified should not become an excuse for avoiding this legislatively mandated responsibility, or for assuming in the analysis that this action will not have its own associated impacts.

4. CONCLUSION

The present Draft EIS as written does not serve its legislatively mandated purposes. The impact analyses in particular is structured in various ways so that justifies the proposed action more than it takes a hard look at the impacts. The social and cultural analyses need to be re-done, in order to take a hard look at impacts required for an EIS. At the least, a more balanced analysis probably would strengthen the *Cultural Resource Avoidance Alternative* (pp. 40-41). We anticipate that buffer zones around the petroglyph and paint-gathering sites should be established, and they should be protected from vandalism.

Montana Department of Transportation
2701 Prospect Avenue
PO Box 201001
Helena MT 59620-1001

Marc Racicot, Governor

8

May 3, 1994

Bill Matthews, Project Manager
Bureau of Land Management
Powder River Resource Area
Miles City Plaza
Miles City, MT 59301

Subject: Western Energy Company Coal Lease Application (MTM-80697) EIS

8-1 It appears that Western Energy Company's application to lease an additional 2061 acres of federal coal lands will have no significant impact on the highway system under our jurisdiction.

Thank you for the opportunity to comment.

Dan Martin, Supervisor
Data Collections & Analysis

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, OMAHA DISTRICT
215 NORTH 17TH STREET
OMAHA, NEBRASKA 68102-4978

REPLY TO
ATTENTION OF

9 Planning Division

May 6, 1994

Ms. Mary Alice Spencer
Bureau of Land Management
Powder River Resources Area
Miles City Plaza
Miles City, Montana 59301-2844

Dear Ms. Spencer:

Thank you for the opportunity to review the Draft Environmental Impact Statement for the Western Energy Company coal lease application in Rosebud County, Montana. We offer the following comments.

9-1 The Corps of Engineers' primary responsibility in reviewing the environmental documents of other agencies is to ensure that Section 404 of the Clean Water Act is adequately addressed. If the proposed action involves any work in wetlands or waters classified as waters of the United States, a Section 404 permit may be required. For a detailed review of the permit requirements, final project plans should be sent to:

Mr. Robert McInerney
U.S. Army Corps of Engineers
c/o DNRC/CDD
1520 East 6th Avenue
Helena, Montana 59620-2301

If you have any questions, please contact Ms. Jeanette Conley of our staff at (402) 221-3133. Thank you again for the opportunity to review this proposal.

Sincerely,

Richard D. Gorton
Chief, Environmental
Analysis Branch
Planning Division

Responses to Public Comments

1-1

The BLM verified the error and made the correction in the final environmental impact statement.

2-1

Thank you for your letter commenting on the draft environmental impact statement. Most of the comments pertain to the National Historic Preservation Act Section 106 consultation process. Subsequent to receiving the letter, the BLM responded to the State Historic Preservation Office with information regarding the ethnographic study, description of the alternatives, traditional cultural properties, and eligibility for the National Register of Historic Places. The BLM anticipates that the Section 106 consultation process will be complete prior to the issuance of the Record of Decision.

3-1

In order to consult with the variety of individuals who might be affected by this decision, the BLM held scoping meetings in July 1992 at Lame Deer, Hardin, and Colstrip, Montana. Due to low attendance at those sessions, meetings were held in Lame Deer and Colstrip in August 1992, with larger attendance. A contract was let to Ethnoscience, an ethnographic research firm at Billings, Montana, to conduct studies among the affected Native American groups. The objective of the study was to identify contemporary use areas as well as traditional cultural properties. Legal mandates imposed by the National Historic Preservation Act and the American Indian Religious Freedom Act require the BLM to identify sites which may require protection. A number of sites were identified through this process which must be evaluated for protection.

3-2

The BLM has selected the alternative which will protect the traditional cultural properties while maximizing the recovery of coal resources. The BLM recognizes there will be some loss of coal royalties associated with the selection of this alternative.

3-3

The BLM recognizes, for the foreseeable future, the area will not be available for spiritual use while mining is occurring. When mining is concluded, the issue of access to the sites will be between the private surface owner and users. The BLM has no control over access to the privately owned surface of these lands.

3-4

The typographical errors in appendix 4, page 59 (now appendix 5), and appendix 9, page 109 (now appendix 10), have been corrected in the final environmental impact statement.

4-1

In the final environmental impact statement, the BLM has recommended leasing of the entire application area, the Proposed Action-Preferred alternative of the draft environmental impact statement, by recommending adoption of two mitigation measures. One mitigation measure will provide for a 160-foot buffer zone around the cultural sites to protect them from disturbance. The other mitigation measure will provide for native tree species to be planted in the buffer zone to screen the sites. Adopting these mitigation measures will provide protection for the traditional cultural properties as well as allowing for the maximum recovery of coal from the lease application area.

5-1

The BLM recognizes that there is a difference in the estimated amount of reserves lost in the proposed alternative between WECo and BLM figures in the draft environmental impact statement. The BLM has contacted the company in order to resolve the differences. It appears that the difference is due to the interpretation of the extent of the 160-acre buffer zone. The figures used by Northwest Regional Evaluation Team to calculate fair market value will reflect the resolution of this difference.

6-1

The Environmental Protection Agency's comments on the draft environmental impact statement regarding air quality raises questions and issues that are normally addressed in the mine permit and air quality permit approval process. The BLM contacted the Montana Department of Health and Environmental Sciences Air Quality Bureau in order to respond to the comments.

The BLM discussed your comments with the Montana Department of Health and Environmental Sciences Air Quality Bureau. The BLM confirmed that the Colstrip area was designated as being in nonattainment of the federal secondary total suspended particulate standards in 1986. However, the Montana Air Quality Bureau indicated that from a procedural or regulatory standpoint, this is no longer significant because the particulate standards are now based on particles less than 10 microns in diameter. Monitoring in the area has consistently shown compliance with the new standards. It is assumed that the nonattainment designation will be removed at some point in the future.

When BLM contacted the Montana Air Quality Bureau they indicated that the primary component of the Montana State Implementation Plan relative to the leasing action would be maintenance of air quality compliance along with the attainment status described above. This is done primarily through the air quality permit process. WECo's Area C operations are regulated under air quality permit 1570C, which includes operational requirements (Best Available Control Technology) and air monitoring. The need for a new or altered air quality permit would be based on the potential for an increase in production and air emissions rather than the leasing action itself. Any new production or emissions relative to the leasing action would be reviewed at the time of a specific proposed development.

The Montana Air Quality Bureau said that WECo submits quarterly air quality monitoring reports which are available from their office.

According to the Montana Air Quality Bureau, an amended permit would be required if the leasing action led to an increased level of production or emissions.

The Montana Air Quality Bureau responded that air quality analyses, including computer modeling, have been done with WECo's previous air quality permits and some subsequent changes. Future alterations would require similar analyses to verify continued compliance.

6-2

The BLM agrees that table 3.14 is unclear. It has been deleted from the final environmental impact statement. The paragraph regarding data adequacy standards has been moved to the "Introduction" in chapter 3. A copy of the Data Adequacy Standards has been sent to the Environmental Protection Agency.

6-3

The Montana Bureau of Mines and Geology prepared appendix 10 and reviewed the hydrology section of the draft environmental impact statement. The appendix refers to recent data which indicates a better "hydraulic connection" than previously predicted. However, it also states that the current data is inconclusive and that studies are ongoing to determine the potential impacts. The data to date is from one monitored well in the sub-McKay aquifer. The statements on pages 35 and 36 in the draft environmental impact statement are substantially correct and are not "contradicted" by the findings of the appendix. There may be some localized impacts near abandoned exploration boreholes, but as the appendix concludes, "it is unlikely these aquifers will be degraded to the degree that the water is unusable." In other words beneficial uses of the water in the sub-McKay aquifers have not been affected.

6-4

The BLM feels that the data presented in appendix 10 warrants your characterization of the potential problem as "significant degradation" and "serious impacts." The Montana Bureau of Mines and Geology states that the data indicates the potential for localized, short-term impact to water quality. There is no indication the regional flow pattern or hydrologic balance outside the permit area will be affected. Refer to the "Conclusions Based on Projected Hydrologic Impacts" section in appendix 10 of the final environmental impact statement.

The mine permitting regulations (Administrative Rules of Montana 26.4.648, Water Rights Replacement) require that mining companies identify wells that will be disturbed by mining. The rule states that where the postmining land use dictates a need for water, the company will replace it and any other sources which can be shown to be diminished, affected by contamination or interrupted by the proposed mining operations. WECo's Area C mining permit includes this provision.

6-5

The reconstruction of the stream channels and restoration of stream flow will occur after mining has taken place following the requirements of mine permit SMP 82003. This concern is part of the mine permitting process rather than the leasing process and mitigation measures will be addressed in amendments to the mine permit.

6-6

The "Introduction" to chapter 3 states that wetlands are not involved in this action. The Powder River Resource Area Wildlife Biologist has verified that there are no wetlands in the lease proposal area. The text in chapter 3 had been expanded to reflect this information.

6-7

The cumulative analysis model used in the West Rocky Butte Environmental Impact Statement was appropriate for the scope of the impacts expected to result from the Preferred alternative, the development of a new mine in the Southern Powder River Basin. By contrast, the Preferred alternative for the WECo proposed coal lease environmental impact statement would result in the continuation of mining in the Area C portion of the Rosebud Mine according to the life of mine plan. There would be no increases in production or employment under any of the alternatives. The only difference between the Preferred alternative and the No Action alternative would be the timing and the location of the related impacts.

This analysis is tiered off the Montana Department of State Lands's 1983 Final Comprehensive Environmental Impact Statement for WECo's Rosebud Mine and the 1988 Environmental Assessment for WECo's Rosebud Mine Area C. The following is taken from the "Introduction" section of the 1983 environmental impact statement:

"This EIS is not the first to be written on the Rosebud Mine. Eight others have been published since 1973, dealing with a different part of the operation or regional coal development...This document, unlike former EIS's, is the first to look at the entire mine in one analysis... as Western Energy submits specific plans for mining (or leasing)... it will provide a source of information, serving as a basis for supplemental EISs and environmental analyses to be written in the future. Second, it will discuss "cumulative " impacts—that is, the impacts expected to arise during the entire mine life in all parts of the mine added together."

The cumulative impacts analysis is incorporated by reference and the site-specific impact analysis of leasing and mining the proposed coal lease tracts concentrates on the issues relevant to the decision to be made: Native American religious concerns and water quality (see appendices 3 and 10).

7-1

The term "traditional cultural property" was defined in the draft environmental impact statement in the "Glossary." This definition was taken from the National Register Bulletin 38 (USDI, National Park Service 1990). The definition has been expanded in the new appendix 9. Reference to Bulletin 38 and National Register criteria definitions have been added, where needed, to the text of this document.

7-2

The major source used for the traditional cultural property information was the ethnographic study prepared by Kooistra-Manning and others. This study is referenced on page 25 in the "Traditional Cultural Properties" section and on page 113 in the "References" section of the draft environmental impact statement. Definitions for "sites with intangible spiritual attributes" and "contemporary use areas" have been expanded in this document in the new appendix 9 and remain in the "Glossary" section.

7-3

The BLM has made some changes to the Preferred alternative in the final environmental impact statement that more accurately reflect the conclusions of the ethnographic study. During the preparation of the ethnographic study and the draft environmental impact statement, the Crow and Northern Cheyenne tribes were consulted about the results of the study. They both approved of the study's results in letters to the BLM's Miles City District Office, dated August 27, 1993.

7-4

The statement on page 43 of the draft environmental impact statement seems to imply that the impacts to cultural properties are insignificant because of the limited number of sites affected by mining. It has been rewritten to more accurately reflect the potential impacts and the proposed mitigation for each of the five sites discussed on pages 37 and 38 of the draft environmental impact statement. The Preferred alternative has been modified to exclude from mining the two traditional cultural properties in section 32, T. 2 N., R. 40 E. A buffer zone and a screen of trees will protect these sites from the adjacent mining activity. These protective measures were developed in consultation with members of the Northern Cheyenne tribe during the ethnographic study. Although these sites will be protected from mining, they are not accessible to tribal members because they are located on private surface which the BLM does not control.

7-5

The decision to be made is whether or not to lease 2,061 acres of federal coal in Area C of the Rosebud Mine. Mining will continue without the federal lands in the coal lease application according to the Company's plan in appendix 6. The potential impacts of mining in Area C with and without the lease application are analyzed in the three alternatives. The purpose of cumulative analysis is to identify if the Proposed Action, combined with everything else that is occurring or is expected to occur in the area puts a resource over/under some threshold or results in unintended or off-site impacts.

The draft environmental impact statement portrays the potential environmental impacts of mining the proposed coal lease tracts in accordance with the life-of-mine plan. The cumulative impacts of mining the entire Rosebud Mine, including Area C, was addressed in the Montana Department of State Land's 1983 Final Comprehensive Environmental Impact Statement for WECo's Rosebud Mine and the 1988 Environmental Assessment for WECO Rosebud Mine Area C extension area. This environmental impact statement is tiered to these previous analyses. The analysis in the environmental impact statement focuses on the issues identified at the public scoping meetings and those identified by the Interdisciplinary Team that prepared the environmental impact statement. The analysis of the proposed coal lease may appear to be "incremental" as it relates to the mining of Area C. It is not intended to "slight"

or "trivialize" the impact of mining the proposed coal lease tracts. The level of the analysis is dictated by the scope of the action and the decision to be made.

7-6

The example used in your letter to illustrate the point misinterprets our intentions. The concerns of the Elders are included in chapter 4. The Elders continue to be concerned about the impacts of mining in the area. The National Environmental Policy Act requires that impacts be identified and mitigated, if possible, but the law recognizes there may be irretrievable and irreversible impacts of any action. Perhaps the Elders' concern falls into that category.

7-7

The environmental impact statement identifies changes to the existing conditions and trends as a result of the proposed action. The changes can be characterized as beneficial or adverse and significant or insignificant to communities or individuals.

There will be no additional impacts, changes in the existing condition or trends as a result of approving or disapproving the Preferred alternative. The effect on the local and regional economy would be neutral.

A buffer will be established around the traditional cultural properties to protect against the effects of mining. However, the BLM does not own the surface of the lands in question, and therefore, has limited control over surface activities other than those relating to development of the coal resources.

8-1

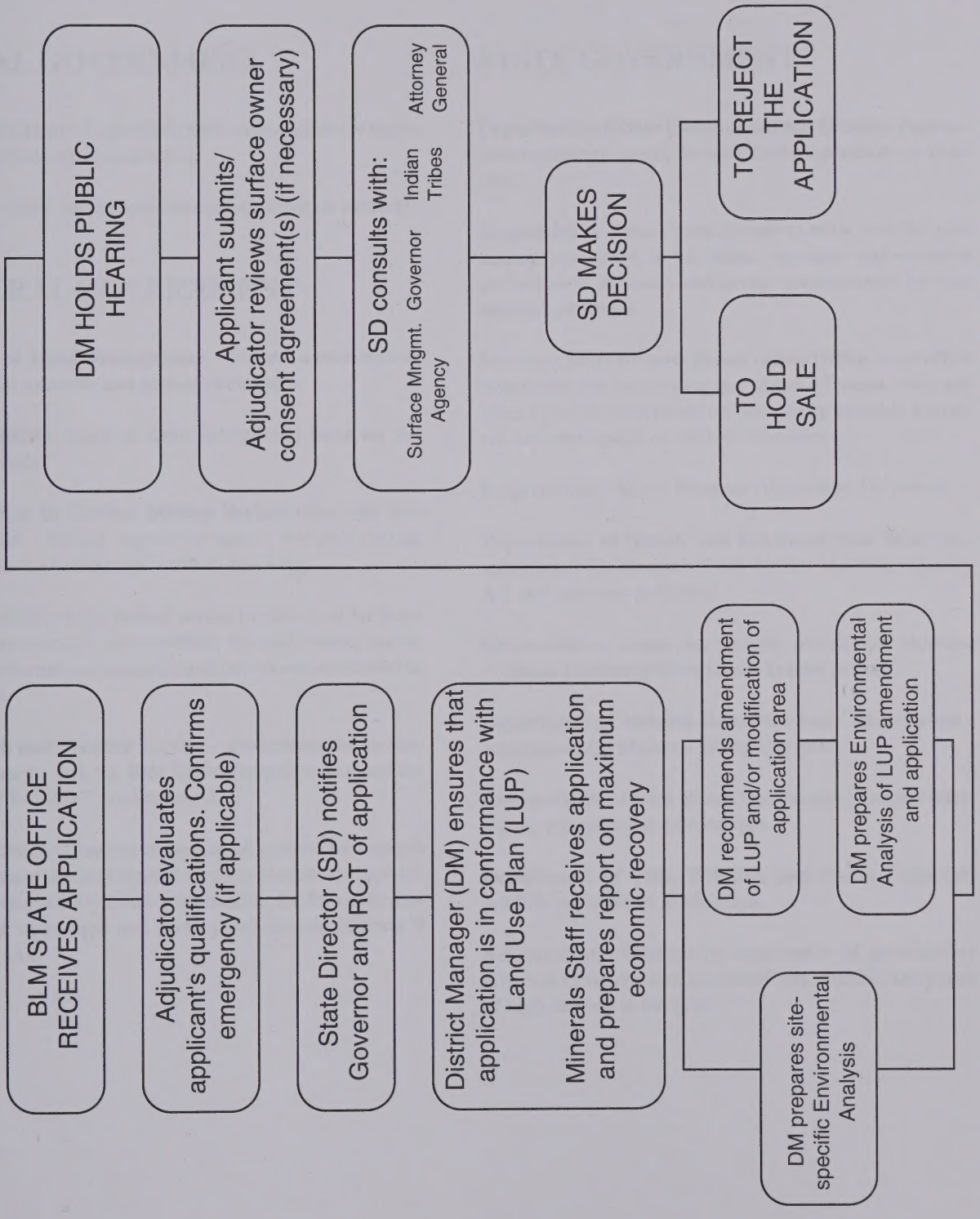
Thank you for taking the time to review the draft document.

9-1

Actions addressed by Section 404 of the Clean Water Act would be covered in the mine permit process rather than the coal leasing process. The Powder River Resource Area Wildlife Biologist has verified that there are no wetlands in the lease proposal area. The text in chapter 3 had been expanded to reflect this information.

APPENDIXES

APPENDIX 1
COMPETITIVE COAL LEASING


COAL LEASING BY APPLICATION FLOW CHART
BLM STATE OFFICE RECEIVES APPLICATION
Adjudicator evaluates applicant's qualifications. Confirms emergency (if applicable)
State Director (SD) notifies Governor and RCT of application
District Manager (DM) ensures that application is in conformance with Land Use Plan (LUP)
Minerals Staff receives application and prepares report on maximum economic recovery
DM prepares site-specific Environmental Analysis
DM recommends amendment of LUP and/or modification of application area
DM prepares Environmental Analysis of LUP amendment and application
DM HOLDS PUBLIC HEARING
Applicant submits/ Adjudicator reviews surface owner consent agreement(s) (if necessary)
SD consults with:
Surface Mngmt. Agency
Governor
Indian Tribes
Attorney General
SD MAKES DECISION
TO HOLD SALE
TO REJECT THE APPLICATION

APPENDIX 2
MAJOR FEDERAL, STATE, AND COUNTY AUTHORIZING ACTIONS

LOCAL GOVERNMENT

Rosebud County Commissioners - responsible for maintenance of county-owned roads.

Responsibility: Issues road relocation permit (if needed).

FEDERAL GOVERNMENT

Bureau of Land Management - federal administrative agency for minerals and surface in this area.

Responsibility: Issue or deny federal coal lease for the subject lands.

U.S. Office of Surface Mining Reclamation and Enforcement - federal regulatory agency for coal mining operations on federal coal lands in Montana.

Responsibility: Issue federal permit to mine coal for these lands; has oversight responsibility for coal mining operations (performance standards and permit requirements) in Montana.

U.S. Fish and Wildlife Service - administers the Endangered Species Act, the Bald Eagle Protection Act, and the Fish and Wildlife Coordination Act.

Responsibility: Concurs on biological opinion for impacts to threatened and endangered species; concurs on application of unsuitability criteria application for federally protected or threatened and endangered species (criteria 9 through 14).

STATE GOVERNMENT

Department of State Lands - Coal and Uranium Bureau - state regulatory agency for coal mining operations in Montana.

Responsibility: Issues state permit to mine coal for coal mining operations in Montana; regulates and enforces performance standards and permit requirements for coal mining operations.

Montana State Historic Preservation Office - state office responsible for cooperating and advising federal, state, and other agencies/individuals on potentially valuable historical, archaeological, or cultural resources.

Responsibility: Issues Montana Antiquities Act permit.

Department of Health and Environmental Sciences - administers the Montana Clean Air Act and Water Quality Act and monitors pollutants.

Responsibility: Issues Air Quality permit and Montana Pollutant Discharge Elimination System permit.

Department of Natural Resources and Conservation - administers the Montana Water Use Act.

Responsibility: Issues Water Use permits, assigns water rights, and approves dam designs.

Department of Fish, Wildlife, and Parks - manages wildlife populations in Montana.

Responsibility: Concurs on application of unsuitability criterion 15 for resident species of fish, wildlife, and plants of high interest to the state.

APPENDIX 3
SPECIAL COAL LEASE STIPULATIONS

In addition to observing the general obligations and standards of performance set out in the current regulations, the lessee shall comply with and be bound by the following stipulations. These stipulations are also imposed upon the lessee's agents and employees. The failure or refusal of any of these persons to comply with these stipulations shall be deemed a failure of the lessee to comply with the terms of the lease. The lessee shall require his agents, contractors, and subcontractors involved in activities concerning this lease to include these stipulations in the contracts between and among them. These stipulations may be revised or amended, in writing, by the mutual consent of the lessor and the lessee at any time to adjust to changed conditions or to correct an oversight.

CULTURAL RESOURCES

(1) Before undertaking any activities that may disturb the surface of the leased lands, the lessee shall conduct a cultural resource intensive field inventory in a manner specified by the Authorized Officer of the BLM on portions of the mine plan area, or exploration plan area, that may be adversely affected by lease-related activities and which were not previously inventoried at such a level of intensity. Cultural resources are defined as a broad, general term meaning any cultural property or any traditional lifeway value, as defined below:

> Cultural property: a definite location of past human activity, occupation, or use identifiable through field inventory (survey), historical documentation, or oral evidence. The term includes archaeological, historic, or architectural sites, structure, or places with important public and scientific uses, and may include traditional cultural or religious importance to specified social and/or cultural groups. Cultural properties are concrete, material places, and things that are classified, ranked, and managed through the system of inventory, evaluation, planning, protection, and utilization.
>
> Traditional lifeway value: the quality of being useful in or important to the maintenance of a specified social and/or cultural group's traditional systems of (a) religious belief, (b) cultural practice, or (c) social interaction, not closely identified with definite locations. Another group's shared values are abstract, nonmaterial, ascribed ideas that one cannot know about without being told. Traditional lifeway values are taken into account through public participation during planning and environmental analysis.

The cultural resources inventory shall be conducted by a qualified professional cultural resource specialist; i.e. (archaeologist, anthropologist, historian, or historical architect, (as appropriate and necessary), and approved by the Authorized Officer (BLM if the surface is privately owned). A report of the inventory and recommendations for protection of any cultural resources identified shall be submitted to the Regional Director of the Office of Surface Mining Reclamation and Enforcement by the Authorized Officer. Prior to any on-the-ground cultural resource inventory, the selected professional cultural resource specialist shall consult with the BLM, the Northern Cheyenne Cultural Protection Board, and the Crow Historic and Cultural Committee. The purpose of this consultation will be to guide the work to be performed and to identify cultural properties or traditional lifeway values within the immediate and surrounding mine plan area. The lessee shall undertake measures, in accordance with instructions from the Regional Director to protect cultural resources on the leased land. The lessee shall not commence the surface-disturbing activities until permission to proceed is given by the Regional Director in consultation with the Authorized Officer.

(2) The lessee shall protect all cultural resource properties within the lease area from lease related activities until the cultural resource mitigation measures can be implemented as part of an approved mining and reclamation plan or exploration plan.

(3) The cost of carrying out the approved site mitigation measures shall be borne by the lessee.

(4) If cultural resources are discovered during operations under this lease, the lessee shall immediately bring them to the attention of the Regional Director, or the authorized officer of the surface managing agency if the Regional Director is not available. The lessee shall not disturb such resources except as may be subsequently authorized by the Regional Director. Within two (2) working days of notification, the Regional Director will evaluate or have evaluated any cultural resources discovered and will determine if any action may be required to protect or preserve such discoveries. The cost of data recovery for cultural resources discovered during lease operations shall be borne by the surface managing agency unless otherwise specified by the

authorized officer of the BLM or of the surface managing agency (if different).

(5) All cultural resources shall remain under the jurisdiction of the United States until ownership is determined under applicable law.

PALEONTOLOGICAL RESOURCES

If a paleontological resource, either large and conspicuous, and/or of significant scientific value is discovered during construction, the find will be reported to the Authorized Officer immediately. Construction will be suspended within 250 feet of said find. An evaluation of the paleontological discovery will be made by a BLM approved professional paleontologist within five working days, weather permitting, to determine the appropriate action(s) to prevent the potential loss of any significant paleontological value. Operations within 250 feet of such discovery will not be resumed until written authorization to proceed is issued by the Authorized Officer. The lessee will bear the cost of any required paleontological appraisals, surface collection of fossils, or salvage of any large conspicuous fossils of significant interest discovered during the operation.

RESOURCE RECOVERY AND PROTECTION

Any proposed bypass of Federal coal determined to be economically recoverable must have the written approval of the Authorized Officer of the BLM in the form of an approved modification to the Resource Recovery and Protection Plan (R2P2) prior to the Federal coal being bypassed (43 CFR 3482.2(c)(2). Failure to comply with this requirement shall result in the issuance of a Notice of Noncompliance by the Authorized Officer. The Notice of Noncompliance will include the amount of damages to be assessed for the unauthorized bypass of Federal coal as determined by the authorized officer. The amount of damages, at a minimum, will be the amount of royalty to be assessed as determined by the Authorized Officer to compensate the Federal government for the unauthorized bypassed Federal coal.

PUBLIC LAND SURVEY PROTECTION

The lessee will protect all survey monuments, witness corners, reference monuments, and bearing trees against destruction, obliteration, or damage during operations on the lease areas. If any monuments, corners or accessories are destroyed, obliterated, or damaged by this operation, the lessee will hire an appropriate county surveyor or registered land surveyor to reestablish or restore the monuments, corners, or accessories at the same locations, using surveying procedures in accordance with the "Manual of Surveying Instructions for the Survey of Public Lands of the United States." The survey will be recorded in the appropriate county records, with a copy sent to the Authorized Officer.

APPENDIX 4
SURFACE MINE PERMIT STIPULATIONS

SURFACE MINE PERMIT AMENDMENT FORM
COAL AND URANIUM BUREAU

RECLAMATION DIVISION
MONTANA DEPARTMENT OF STATE LANDS

Amendment No. *002* to Surface Mine Permit No. *85003C*.

Pursuant to Application for Surface Mine Permit Amendment No. *00125* received by the Department on *April 16, 1984*, Surface Mine Permit No. *85003C* issued to *Western Energy Company* on *August 20, 1987*, is hereby amended as follows:

An additional 6,754.6 acres is hereby permitted for mining and related activities, bringing the total permitted acreage within Area C to 9,490 acres, more or less. The permitted acreage lies within the following tracts of Rosebud County, Montana:

T. 1 N., R. 41 E., sections 5, 7, and 8
T. 1 N., R. 40 E., sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 15, and 16
T. 2 N., R. 40 E., sections 28, 29, 31, 32, 33, 34, and 35
T. 1 N., R. 39 E., sections 1, 2, and 3
T. 2 N., R. 39 E., sections 27, 34, 35, and 36

Conditions/Stipulations:

See Stipulations attached hereto and made a part hereof.

ALL OTHER TERMS AND CONDITIONS OF SURFACE MINE PERMIT NO., 85003C, EXCEPT THOSE TERMS AND CONDITIONS EXPRESSLY AMENDED HEREIN, SHALL REMAIN IN FORCE AND FULL EFFECT FOR THE PERIOD APPROVED BY THE PERMIT.

Amendment No. 002
Surface Mine Permit No. 85003C
Stipulations

26.4.303

Western Energy may not conduct mining and reclamation operations on any lands for which all necessary leases have not been secured. If Western Energy fails to secure such leases, Western Energy shall submit to the Department, for review and approval, appropriate proposed revisions to the mining and reclamation plan.

26.4.304. 638

At least one year prior to disturbing land in West Fork Armells Creek drainage on the north side of the box canyon area, approximately between coordinates E2500, N48000 and E5300, N48500 as shown on Sheet 3 of 3, Exhibit A, Approximate Mine Plan Map, Western Energy shall consult with the Department on appropriate sediment control measures needed, if any, during mining and reclamation operations in this area.

26.4.308, 1134, 1135

An appropriate proposed revision to the mining and reclamation plan, exhibiting non-infringement of the 100-foot "buffer zone" and/or no direct disturbance of the county road pursuant to 26.4.1134 and 1135, must be submitted to the Department, for review and approval, a minimum of two years in advance of anticipated "buffer zone" infringement and direct disturbance of the county road in sections 4, 5, and 6 of T. 1 N., R. 40 E., in sections 31, 32, and 33 of T. 2 N., R. 40 E., and in sections 34, 35, and 36 of T. 2 N., R. 39 E., if approval is not received by that time from the Rosebud County Commissioners to infringe on the "buffer zone" of and/or relocate the county road.

26.4.313. 701

Within 90 days of the date of permit issuance, Western Energy shall submit to the Department, for review and approval, the following:

a plan to be incorporated into the permit for the reestablishment of the mixed shrub revegetation type. This plan must address appropriate locations of that type on the post-mining landscape, slopes, aspect, plant rooting material to be used, species and densities thereof to be seeded or planted, and any other pertinent information to be included as required by the Department.

appropriate revisions and corrections to the soil salvage and redistribution plan and/or the revegetation plan in Volume 1 of the permit application and in Volume 1 of Soil Resource Reports. These changes must demonstrate resolution of the soil deficit and discrepancy problems for the ponderosa pine, skunkbush sumac, and mixed shrub revegetation types.

These plans and changes must be developed in consultation with the Department.

26.4.314

Regarding Western Energy's plan to mine into the alluvium of East Fork Armells Creek in sections 10 and 15, T. 1 N., R. 40 E., Western Energy shall:

1. Notify the Department two years prior to the anticipated opening of the boxcut into the alluvium of its intent to disturb this aquifer and present a plan for approval to assess the need for alluvial aquifer dewatering;
2. Include in the dewatering assessment plan evaluations of proposed boxcut conditions based on exploration and well logs, relevant aquifer data and test trenches dug in the proposed boxcut zone in areas evaluated to represent the greatest potential for aquifer discharge to the pit and aquifer material sloughing;
3. If the assessment indicates a stability concern, conduct appropriate stability analysis;

4. If dewatering is necessary, develop and implement an alluvial aquifer dewatering plan, approved by the Department prior to opening the boxcut;
5. Demonstrate to the Department that any needed and approved dewatering is completed prior to opening the boxcut; and
6. If low permeability berms are used to reduce pit inflows from the alluvium, measure the permeability of the berms by a means approved by the Department as the berms are being constructed to ensure that they do not have lower permeability than the proximal overburden

26.4.318

Western Energy must carry out the additional testing needed to resolve the National Register of Historic Places eligibility questions on sites 24RB287, 290, and 328 by 1990.

Western Energy must submit detailed mitigation proposals, for review and approval by the Department, for sites 24RB165 (Recognition Rock); 24RB335 (Castle Rock Post Office), and, if eligible, 24RB328 (Pinkerton Homestead) by 1990. Because these sites are deteriorating, western Energy shall expeditiously implement and promptly complete these mitigation plans, upon approval, in a time frame determined in consultation with the Department.

Western Energy must, at least a year prior to the proposed mitigation dates, submit detailed mitigation proposals, for review and approval by the Department, for sites 24RB287 (Blackbird Draw), 24RB288 (Under the Wire), 24RB290 (Pine Fringe), 24RB292 (Little Cave), 24RB308 (Buteo), 24RB874 (Insite), 24RB878 (Foresite), 24RB1058 (Farley Lookout), and 24RB882 (Garvader).

The agreed-upon mitigation measures, including final reports, must be completed prior to Western Energy receiving permission to disturb any of the above sites.

26.4.1131

If, in the course of mining, Western Energy encounters any previously unrecorded cultural resource sites, it shall immediately contact the Office of Surface Mining, the Montana Department of State Lands, and the State Historic Preservation Office and take appropriate action.

APPENDIX 5
WESTERN ENERGY COMPANY COAL LEASE APPLICATION

1. Description of Affected Lands

Township 1 North, Ranch 40 East
Section 6: All
Section 8: E1/2, N1/2NW1/4
Section 14: SE1/4, S1/2SW1/4

Township 2 North, Range 40 East
Section 32: All

Township 1 North, Range 39 East
Section 2: S1/2NW1/4, N1/2NE1/4SE1/4

Total Acreage: 2,000 acres (more or less)

2. Preliminary Data (43 CFR 3425.1-7)

(b)(1) Map of the Area - See Exhibits 1 & 2

(b)(2)(i) No additional exploration and/or exploratory drilling is anticipated for these areas. Exploration and drilling was completed in the 1980-1985 era in preparation for the submittal of the Area C Amendment Permit Application and the Area B Extension Permit Application.

(b)(2)(ii) The mining production sequence adopted for the new lease tracts will be incorporated into the existing mine plan for Area C, and the proposed mine plan for Area B Extension, as all of the proposed lease tracts are interior to one of the two aforementioned mine plans and mine permits.

Mining Sequence

The mining proposed for this area will be done by dragline excavation and will begin with a boxcut along the northern portion of the outcrop line. Successive mining passes will be made parallel to the boxcut, and mining will advance in a southerly direction. At such time as the overburden depth increases, the passes will be extended with a boxcut along the southeastern portion of the outcrop line. This pit configuration will be maintained until the final pit limits are reached.

Topsoil and subsoil will be stripped from the mining area in advance of each pass. Average depth of topsoil stripping will be 6 to 8 inches; this will be accomplished by scrapers which will strip, transport, and deposit the topsoil on regraded areas or in topsoil storage areas. Crawler tractors may be used to assist the scraper in loading.

After topsoil has been removed, subsoil will be stripped at an average depth of 2.5 feet. Scrapers will strip, transport, and deposit the subsoil on regraded areas or in subsoil storage areas.

Next, the overburden in each pass will be drilled and blasted; and crawler tractors will level the blasted material to create a sound working base for the dragline. Overburden stripping will be done by the dragline; mobile diesel equipment will assist the dragline as needed.

Overburden stripping will be accomplished using the area strip mining method in which the overburden in the active pass is cast into the mined out pit created by the preceding pass.

As the dragline exposes the Rosebud seam in each pass, the coal will be drilled and blasted; a 25-cubic yard loading shovel will then load blasted coal into 160-ton coal haulers. If the loading shovel is unavailable to accomplish this work, front-end loaders will be substituted to load the coal. The coal will be hauled to a crusher facility for sizing to 3-inch minus; final product will be loaded onto an overland conveyor for shipment to Colstrip Units 3 and 4.

The spoil piles left by the dragline will be graded with crawler tractors and scrapers if necessary to approximate original contour with slopes not exceeding 5:1, and readied for topsoil and subsoil distribution. This operation will take place within 2 spoil ridges of the active pass. Subsoil will be distributed to a depth of 2 to 2.5 feet, and topsoil will be distributed to a depth of 6 to 8 inches. Scrapers will place both subsoil and topsoil.

Western Energy will recover as much of the Rosebud coal seam as is possible under prevailing pit conditions. Safety wedges may be left when necessary to ensure the safety of the working area. Western Energy recovers 95 percent of the minable reserves.

When the final pit limit is reached, the final highwall created will be reduced, except where indicated on the post mine topography plan, with crawler tractors and scrapers as needed. All highwall reduction will be constructed as convex-concave slopes. The spoil piles adjacent to this final pit will be reduced to a 5:1 slope. Previously stockpiled subsoil and topsoil will be distributed on these slopes with scrapers.

Following topsoil placement, the seedbed will be prepared, and then seeding will take place by drill and broadcast techniques. Ponderosa Pine will be planted as necessary to enhance the reclamation plan.

Annual Production Rate

The annual coal production rate from mine permit Area C will average approximately 6.5 million tons per year, depending on the availability of equipment, and the coal needs of Colstrip Generating Units 3 & 4. Below is a list of equipment which is presently active in the permit area:

Dragline (75 yd^3)	1	Motor Graders	2
Coal Loading Shovel	1	Front-end Loaders	2
Coal Drill	1	Scrapers	4
Overburden Drill	1	Explosives Truck	1
Coal Hauler (160 tons)	6	Service Truck	1
Dozers	6	Welding Truck	1
Water Wagons	2	Fuel Truck	1

(b)(2)(iii) Please see Exhibits 1 and 2 for the relationship between the mining operations anticipated on the lands applied for and existing or planned mining operations on adjacent Federal or non-Federal lands.

Location and Description of Facilities

Support facilities for the Rosebud Coal Mine include a variety of structures such as offices; shop; warehouse; an employee change facility; coal crushing, handling, and loadout facilities. These facilities are located at the eastern end of the mine.

The main offices for the Rosebud Coal Mine will house mine operations, engineering, environmental, accounting, payroll, computer, and safety departments. Additional structures in the complex include a diesel and gasoline fueling station for both large mobile mine equipment and mine pickup truck fleet. Mobile equipment and employee parking areas will be provided at the complex.

The coal crushing, handling, and loadout facilities will include the following: raw coal storage area, truck dump, primary crushers, secondary crushers, sampling location, and covered conveyors. The facility is located in the NE 1/4 of Section 12, Township 1 North, Range 40 East.

(b)(2)(iv) The existing land use is dry land farming, livestock grazing, and wildlife habitats. This applies also to adjacent lands, except for those lands already subject to an active mining operation.

The Colstrip area is situated within the north central region of the Powder River Basin, a sedimentary and structural basin formed by a down-warped sequence of Paleozoic, Mesozoic, and Cenozoic sediments surrounded by structural uplifts. These uplifts include the Big Horn on the southwest, the Black Hills to the southeast, the Porcupine Dome directly north, and the Miles City Arch on the northeast. Southward the basin continues into Wyoming where it widens and the sedimentary sequence thickens. Bedding in the basin generally dips toward the basin axis; however, minor local anticlinal and synclinal folding is common.

Within the Montana portion of the Powder River Basin, the Paleocene-age Fort Union Formation occupies 800 square miles, a greater surface area than any other formation. Fort Union rocks are subdivided into three members. These include in descending order the Tongue River, Lebo, and Tullock members. The Tongue River member contains the major coal reserves of the Powder River Basin.

Past geologic work in the Colstrip area has centered upon delineation of ground-water resources and Tongue River Member coal beds. Dobbin (1930) and Pierce (1936) mapped and named the coal beds of the Forsyth and Rosebud coal fields. Kepferle (1954) and Ayler, Smith and Deutman (1969) outlined the surface minable coal of the area. A comprehensive description of the quality and the reserves of the Colstrip coal deposit are found in Matson, Blumer, and Wegelin (1973). Groundwater sources in the area were investigated by Renick (1929) and Perry (1935). The effects of strip mining on aquifers were investigated by Van Voast, Hedges, and McDermott (1977).

The Colstrip coal deposit straddles the divide separating Rosebud and Armells Creeks. These streams have eroded the Tongue River Member of the Fort Union Formation into gently rolling terrain. Locally, the streams have incised the valleys, forming dominant bluffs of sandstone and clinker. Clinker or "scoria" areas are the result of thermal metamorphism caused by natural burning of the coal beds along their outcrops.

The Fort Union Formation at Colstrip is 445 feet thick; whereas, to the south it thickens to a maximum 2125 feet. The local dip of the beds is generally south to southeast at 15 to 75 feet per mile. In addition to coal, the strata of the Tongue River Member include find-grained yellowish-gray sandstone, gray silty clay, grayish-white shale, and minor yellow-brown fresh water limestone.

Of the six coal seams in the area, Western Energy plans to mine only the uppermost seam, the Rosebud. The Rosebud averages 18-26 feet in thickness, is subbituminous (averages 8394 BTU's/pound as received) and contains about 0.85 percent sulfur by weight. The Rosebud seam is covered by an average of about 120 feet of overburden. The overburden is shallowest near the outcrop where Western Energy would begin mining, and is over 200 feet thick in areas of higher relief.

The McKay seam is 10-100 feet below the Rosebud. Western Energy has not found a suitable market for the McKay seam because of the coal's tendency to slag at normal boiler operating temperatures. Western Energy therefore does not plan to mine the seam.

To further evaluate the physical and chemical properties of the Rosebud seam and the McKay seam, Western Energy has conducted a detailed drilling program with the holes located on approximately 1000 foot centers to provide samples of the coal.

The entire Rosebud Mine has had several archaeological surveys conducted. Those sites which were eligible for the National Register of Historic Places have been mitigated or avoided. No sites eligible for the Register are located within the sections being applied for. There are no known visual, cultural, or paleontological features on these areas. In addition, no wetlands or floodplains have been identified. The plant species located on site are identical to those located on adjacent land parcels and inside of nearby operating mines. No threatened or endangered species of plants have been identified or located on any existing Federal Lease. A prairie falcon nest site and an abandoned (since 1978) golden eagle nest are located in Section 11, T. 1 N., R. 40 E. Mining has avoided this area and left the sandstone rocks in place.

(b)(2)(v) All welding or open flames will be confined to the facilities area, or in the case of emergency repairs, on areas that have been stripped of vegetation. The heavy equipment, including water wagons, can be used to help control fires on this property or adjacent to the property.

The ultimate goal of the proposed reclamation activities is to return disturbed areas to their pre-mining land uses: dryland farming, livestock grazing, and wildlife habitat. Pre-mining land uses include dryland cropland, native rangeland, and wildlife habitat. Each existing land use within the permit boundary will be reestablished. In addition, no vegetation types will be replaced. Post-mining land use will be essentially the same as pre-mining patterns. Native rangeland and wildlife habitat will be the primary post-mining use.

Reclamation activity is designed to bring these areas back to an equal range condition and similar vegetation composition. Therefore, long-term productivity and maintenance requirements will be the same as now exists.

All disturbed areas will be returned to approximately original contour by grading and backfilling with the use of dozers and scrapers. The post-mining land uses, which will be dry land crops, rangeland, and wildlife habitat, will be promoted by an undulating surface which will minimize erosion and maximize water retention, yet minimize the possibility of sliding.

No significant impact on the area drainage system will occur as a result of the proposed mining operations. The surface drainage system will be reconstructed to reflect the natural hydraulic and hydrologic pre-mining condition. Impact on the drainage system during mining will be minimal. No perennial streams will be impacted. There will be not permanent hydraulic structures left as a result of mining operations.

The two aquifers to be impacted by the mining operations (the Rosebud coal seam and the overburden, comprised of interlayered sediments of the Tongue River Formation and the Upper Fort Union Formation) will exhibit no significant impact after aquifer reclamation nor will there be significant impact on the adjacent, undisturbed aquifers. Water quality of the groundwater in the reclaimed area will exhibit only minor, relatively short-term alterations. Leaching effects in the overburden will add minor concentrations of calcium-magnesium-sulfate constituents until water levels have recovered. At this point, leaching effects will diminish and chemical equilibria will be approached.

The mine site is located in close proximity to Colstrip, Montana, and to one other large operating coal mine. The impact on the local social and infrastructure systems will be minimal as these systems are already in place and servicing a large diverse energy industry in the region.

The hazards to public health and safety should be minimal. The general public's exposure to safety hazards on the mine site will be nonexistent as the public will be excluded from mine property.

(b)(2)(vi) The coal taken from the federal leases, and from elsewhere within the permit area, will be used exclusively by utilities for the production of electricity.

(b)(2)(vii) Western Energy currently operates a large (13 mm tons/year) coal mine in Colstrip, Montana.

Surface owner consent or written evidence thereof will be filed with the State Office as required prior to any notice of sale which may result from this application.

APPLICANT:

Western Energy

/s/ Robert W. Cope
Robert W. Cope
Vice President and General Manager

Date: January 20, 1992

APPENDIX 6
NOTIFICATION AND REQUEST FOR INFORMATION

3400
M-80697

Ms. Dianna Tickner
Director, Contract Administration
Western Energy Company
P.O. Box 99
Colstrip, Montana 59323

Dear Ms. Tickner,

As per your phone conversation with Bill Matthews of my staff, BLM has decided to prepare an EIS on the Western Energy Company coal lease application. A copy of the *Federal Register* notice is attached. Factors which influenced this decision are outlined in the attached memo.

We have prepared a draft preparation plan for the EIS and have attached a copy for your information. The preparation plan is an internal working document that is used by the specialists to prepare the EIS. It is, in essence, the instructions for the specialists. It also contains a copy of the outline of the EIS and the schedule. Please look this over and advise Bill if there are problems with this information and your company's plans.

To prepare the EIS, BLM will need some information from your company to address the Proposed Action and the No Action alternatives. Your responses to these questions will be used to define the limits of our analysis. Please provide this information as soon as possible for inclusion in the final preparation plan.

For the Proposed Action alternative (decision to lease the federal coal lands), we need to know the following:

1. What are the current production levels, employment levels, life-of-mine, taxes paid, e.g., coal severance taxes, royalties, etcetera for Area B, C, and the entire mining area?

2. What has been the annual employment levels from 1985 to now with reasons for changes in employment (if any)? What is the projected annual employment from 1994 to when mining associated with the lease begins? Will additional employees be hired as a result of the lease?

For the No Action alternative (decision not to lease the federal coal lands), we need to know the following:

3. What affect would denying the application have on #1 and #2 as outlined above.

4. What changes, if any, would the company have to make for production, engineering impacts or issues, mining/ reclamation methods, traffic patterns/changes, etcetera? What areas/other coal would the company mine?

5. How much in Federal royalties, taxes, etcetera would be lost by denial of the coal lease application?

6. How would other resources, such as cultural, AIRFA concerns, hydrology, etcetera, be impacted by the denial and subsequent changes the company would have to make?

A generalized mine plan showing the changes the company would make might be helpful and a somewhat easier way to handle the engineering changes the company would make under this alternative.

General questions are:

7. Are there any physical, biological, social and/or economic special considerations that we should be aware of for this project?

Your responses to the above questions will be used by the EIS team members to prepare the EIS. We thank you in advance for your response to this request. Should you have any comments or concerns with the EIS or schedule, let us know. If your company has any questions regarding this letter, please give Bill Matthews a call at 232-7000.

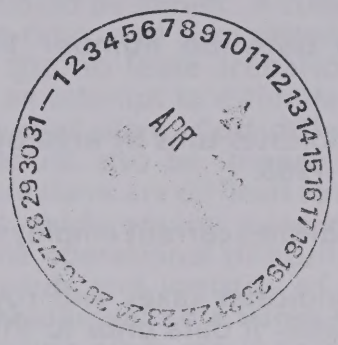
Sincerely,

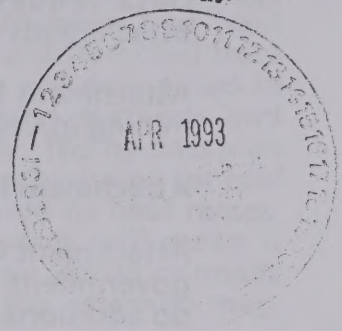
/s/ Arnold E. Dougan
Arnold E. Dougan
Acting District Manager

3 Enclosures
1-Memo (2 pp)
2-Federal Register Notice (3 pp)
3-Preparation Plan (25 pp)

WESTERN ENERGY COMPANY

P.O. BOX 99 / COLSTRIP, MONTANA 59323 / (406) 748-2366





April 7, 1993

Mr. Arnold E. Dougan
Acting District Manager
Bureau of Land Management
P.O. Box 940
Miles City, MT 59301-0940

Dear Mr. Dougan:

You will find attached Western Energy Company's responses to the questions in your letter dated February 17, 1993. Western has provided responses to all questions. For some questions it is difficult to project what will happen years in the future due to the current volatility of the western coal market.

During a discussion with Bill Matthews of your office on April 6, 1993 he explained that the tax information requested could be omitted if it was of a confidential nature. Taxes paid to the State of Montana are confidential to the coal producer and the Department of Revenue. Western feels the information may be valuable for your analysis therefore, it has been included as Attachment Number 3, marked "Confidential and Proprietary Information".

Western has provided the best information currently available on the no-lease mine plan. If there is not sufficient detail to perform your analysis, you require additional information or have questions for clarification, please contact me.

Sincerely,

Dianna Tickner, Manager
Contract Administration & Leasing

DT/bf
attachments
baf/0166/0236

RESPONSE TO BLM QUESTIONS IN FEBRUARY 17, 1993 LETTER

Prepared by Dianna Tickner - Western Energy Company 4/7/93

1. Data requested in question number 1 is presented in the following attachments:

   Attachment No. 1 indicates tons by area by year since Western Energy began mining in Colstrip in 1968.

   Attachment No. 2 indicates current employment levels as of March 28, 1993.

   Attachment No. 3 indicates taxes and royalties paid to Federal and State government since 1985. If data prior to this is required, Western will need to do additional research and submit it at a later date.

2. Attachment No. 4 indicates the staffing levels and reasons for change for the years 1985 through 1992. Currently employment for the mine is projected to decrease approximately 50-60 persons following expiration of two Midwest contracts in 1994 and 1995 should replacement contracts not be secured . This projected lost coal production is from Areas A/B. It does not appear that additional employees will be hired for Area C if the lease is granted. Production for Area C will fluctuate between 6.0 -7.0 million tons per year through 2019. There may be seasonal employment fluctuations on an annual basis due to plant coal demands.

3. Production from the Area C mine is projected to be between 6.0 and 7.0 million tons per year for the life of the Colstrip 3 & 4 power plants. Western Energy's contract with the plants runs through 2019. We are required to deliver the plants requirements in each year, so if these leases are not obtained, WECo. will have to mine the tons from private or other federal leases that we currently hold. These other lease areas, in general, have less favorable mining conditions than those within the lease areas applied for. The leases applied for would allow WECo. to more efficiently and cost effectively maximize the coal resources.

   Mine employment levels for 1994 and 1995 will remain fairly constant. WECo. has several contracts for significant tonnage expiring at the end of 1994 and 1995. While expiration of these contracts will not effect the Area C mine production, they will reduce the overall mine work force if replacement contracts cannot be secured. The Area C mine will require additional workers if the leases are not secured due to higher stripping ratios for replacement tons. Many of the yards which must be moved to expose the replacement tons would need to be moved by mobile equipment due to shorter pit lengths and insufficient dragline capacity.

   Since tonnages will remain constant, Federal and State production taxes paid on tons sold remain constant. Royalties paid to the Federal government would be reduced significantly under the no lease scenario. Federal tons under the no lease situation are reduced from 33.6 million to 6.3 million, with the 6.3 million tons being mined from existing Federal leases held by WECo. If the average Federal royalty rate remains at the 1992 level of approximately $1.35 per ton

the Federal government would loose about $36.7 million in royalty revenue without these tracts.

4. WECo. did not prepare a detailed mine plan which scheduled the periods in which the replacement coal would be mined. A cursory review was completed to define the areas, stripping ratio, and haul distance that would most likely allow replacement tons for the no lease scenario. Overburden and haul distances were quantified in an attempt to estimate the cost differential from the proposed plan to the by-pass plan. Cost differentials are delineated in Attachment No. 5. There would also be impacts to mining methods and engineering required but these items are difficult to quantify. The by-pass plan shortens the mine pass length which requires more in depth scheduling for coal removal and also creates some operational difficulties related to haul ramps. The additional overburden yards and logistics of these yards will make it necessary to employ mobile equipment on a larger scale than would normally be required. The by-pass mining areas are indicated on the attached map, Attachment Number 6.

5. It is estimated that the Federal royalties lost due to the no lease scenario would be approximately $36.7 million utilizing the average Federally royalty paid during 1992. This cost estimate does not take any inflation or potential price decrease/increases into consideration. No reduction to any State or Federal taxes is anticipated in the no lease scenario.

6. A review of the replacement tracts would need to be completed to determine if there are cultural sites existing. Upon determination of such sites, a mitigation plan would be prepared. The possibility, however remote, does exist that there could be sites on these replacement tracts which could prohibit mining. Potential impacts of AIRFA are not known at this time.

   Changing the tracts of land to be mined would have no major impacts to hydrology either surface or groundwater. Surface drainages would be different in appearance, but would still be required to meet the design criteria of our operating permit with the Montana Department of State Lands. Without performing detailed engineering design work it is difficult to determine whether the drainage reconstruction would be more/less expensive.

   Attachment Number 6 delineates the mine areas by-passed and the substitute areas which would be mined. Attachment Number 7 gives the replacement tons by section, indicates the haul distance, and overburden which must be removed to mine these tons.

7. A cursory review of the expense to mine the by-pass coal under the no lease scenario indicates that the cost would be a minimum of $29.1 million greater for the required tons than if the leases were granted. This translates to $0.87 per ton prior to royalties and production taxes. Following the addition of production taxes and royalties the increase is over $1..15 per ton. It is possible that the cost to mine the replacement coal could make it economically undesirable to the customer. Western's profits could be reduced by not having replacement tons which are economically mineable to supply to the plants.

baf/0166/0236

WESTERN ENERGY COMPANY TONS SOLD
FOR THE PERIOD 1968 - 1992
REVISED JANUARY 1993

Year	Area A	Area B	Area C	Area D	Area E	Pit 6	Total
1968	0	0	0	0	0	150,316	150,316
1969	0	0	0	0	0	521,449	521,449
1970	0	0	0	0	0	1,657,737	1,657,737
1971	0	0	0	0	0	5,161,390	5,161,390
1972	0	0	0	0	0	5,500,774	5,500,774
1973	0	0	0	0	0	4,253,781	4,253,781
1974	0	0	0	0	0	3,211,858	3,211,858
1975	3,046,501	0	0	0	2,559,538	801,268	6,407,307
1976	6,159,026	792,080	0	0	2,313,599	0	9,264,705
1977	3,224,270	3,916,870	0	0	2,632,535	0	9,773,675
1978	5,294,552	2,378,712	0	0	2,903,193	0	10,576,457
1979	6,091,064	1,578,539	0	0	4,052,466	0	11,722,069
1980	3,761,579	1,204,835	0	0	5,482,213	0	10,448,627
1981	948,138	5,847,668	0	0	3,590,922	0	10,386,728
1982	0	6,540,437	0	0	2,906,156	0	9,446,593
1983	0	6,332,797	685,149	0	2,555,724	0	9,573,670
1984	61,380	8,205,063	2,679,120	0	961,535	0	11,907,098
1985	2,138,185	6,639,880	2,152,885	0	1,333,649	0	12,264,599
1986	2,224,437	2,279,647	5,227,458	300,334	2,047,515	0	12,079,391
1987	3,220,113	1,161,672	3,881,414	3,799,339	0	0	12,062,538
1988	5,186,502	333,687	6,808,102	3,812,855	0	0	16,141,146
1989	3,056,016	431,735	6,616,481	3,575,107	0	0	13,679,339
1990	2,328,549	879,800	6,127,217	3,632,815	0	0	12,968,381
1991	2,618,923	811,853	6,871,754	3,770,549	0	0	14,073,079
1992	3,500,009	0	7,205,883	3,964,191	0		14,670,083
Total	52,859,244	49,335,275	48,255,463	22,855,190	33,339,045	21,258,573	227,902,790

WESTERN ENERGY COMPANY
EMPLOYEE STATUS REPORT

REPORT AS OF: MARCH 28, 1993
REPORT DATE MARCH 29, 1993

	BUDGET	CURRENT WEEK	LAST WEEK
Salaried Employees			
ACCP	0	0	0
Administration	5	5	5
Business Administration	23	22	22
Contract Administration	5	5	5
Human Resources	8	9	9
Operations	42	40	40
Safety	9	9	9
Technical Services	23	19	19
Subtotal	115	109	109
Part-time Employees	8	6	6
Total Salaried Employees	123	115	115
Non-Salaried Employees			
ACCP	24	28	28
Conveyor	18	10	16
Electricians	18	15	15
Maintenance	55	50	52
Production	182	168	174
Warehouse	7	7	7
Welders	18	18	17
Subtotal	322	296	309
TOTAL ROSEBUD MINE EMPLOYEES	445	411	424
LAYOFFS AND LEAVE OF ABSENCES			
Salaried Extended Medical/LOA		0	0
ACCP Layoffs		0	0
ACCP LOA		0	0
Conveyor Layoffs		9	3
Conveyor LOA		0	0
Mine Layoffs		7	0
Mine LOA		16	17
*FEMALE EMPLOYEES			
Non-Salaried		11	11
Salaried		38	38
*NORTHERN CHEYENNE EMPLOYEES			
Non-Salaried		47	48
Salaried		7	7
*OTHER MINORITY EMPLOYEES			
Non-Salaried		15	15
Salaried		2	2

* Figures include part-time/temporary employees

COMMENTS: MARCH 29, 1993 NO CHANGE SINCE LAST REPORT FOR SALARIED EMPLOYEES

ANNUAL EMPLOYMENT LEVELS
FOR PERIOD OF 1985 THROUGH 1992

YEAR	EMPLOYMENT	REASON FOR CHANGE
1985	448	
1986	348	MPC Plant Shutdown W-47 Tub Project
1987	339	W-47 Completion
1988	384	Production Demand
1989	392	W-5 Dragline Overhaul
1990	380	W-5 Completion
1991	385	ACCP Plant Operational
1992	416	ACCP Plant Operational Company Reorganization

WESTERN ENERGY COMPANY
ESTIMATE OF COST INCREASES FOR NO-LEASE DECISION

ASSUMPTIONS: DRAGLINE YARDS COST $0.28/BCY
TRUCK HAULAGE $0.08/TON MILE
BASED ON CURRENT EXPENSES

COST OF MINING FEDERAL LEASES APPLIED FOR:

LOCATION	BCY OVERBURDEN	OVERBURDEN COST @ $0.28	TONS	AVE HAUL DISTANCE	HAULING COST @ $0.08	TOTAL COST OB & HAUL
SECTION 2	4,776,000	$1,337,280	626,000	13.66	$684,093	$2,021,373
	598,000	$167,440	155,000	16.9	$209,560	$377,000
SECTION 6	69,882,000	$19,566,960	15,564,000	12.96	$16,136,755	$35,703,715
SECTION 32	37,315,000	$10,448,200	13,520,000	11.44	$12,373,504	$22,821,704
SECTION 8	5,027,000	$1,407,560	788,000	10.98	$692,179	$2,099,739
	5,234,000	$1,465,520	847,000	9.24	$626,102	$2,091,622
SECTION 14	16,507,000	$4,621,960	2,018,000	4.54	$732,938	$5,354,898
	139,339,000	$39,014,920	33,518,000	11.46	$31,455,131	$70,470,051

COST OF MINING OTHER LEASES TO GET SAME COAL RECOVERY:

LOCATION	BCY OVERBURDEN	OVERBURDEN COST @ $0.28	TONS	AVE HAUL DISTANCE	HAULING COST @ $0.08	TOTAL COST OB & HAUL
SECTION 34	24,899,400	$6,971,832	4,293,000	20.22	$6,944,357	$13,916,189
SECTION 3	46,106,850	$12,909,918	5,039,000	5.96	$2,402,595	$15,312,513
SECTION 2	677,300	$189,644	130,000	18.04	$187,616	$377,260
SECTION 1	32,398,650	$9,071,622	3,495,000	7.56	$2,113,776	$11,185,398
SECTION 4	3,544,320	$992,410	426,000	10.00	$340,800	$1,333,210
SECTION 9	19,679,880	$5,510,366	2,244,000	10.16	$1,823,923	$7,334,290
	5,663,580	$1,585,802	689,000	8.94	$492,773	$2,078,575
	146,400	$40,992	24,000	8.18	$15,706	$56,698
	40,652,970	$11,382,832	4,161,000	8.86	$2,949,317	$14,332,148
SECTION 11	1,868,640	$523,219	816,000	2.50	$163,200	$686,419
SECTION 17	30,114,310	$8,432,007	3,769,000	10.68	$3,220,234	$11,652,240
SECTION 13	45,761,130	$12,813,116	5,713,000	3.78	$1,727,611	$14,540,728
SECTION 14	9,242,640	$2,587,939	1,188,000	5.30	$503,712	$3,091,651
	1,850,750	$518,210	275,000	4.46	$98,120	$616,330
SECTION 15	8,628,720	$2,416,042	1,256,000	7.20	$723,456	$3,139,498
	271,235,540	$75,945,951	33,518,000	8.84	$23,707,195	$99,653,146

TOTAL COST INCREASE NO LEASE SCENARIO $29,183,095

COMPARISON OF FEDERAL RESERVE VS. REPLACEMENT
MINEABLE COAL RESERVES

BY:DAN NEGETHON/DJW
DATE: 03/23/93 rev. 3/28/93

REPLACEMENT MINEABLE LEASES - DUE TO BYPASS OF UNLEASED FED

SEC.	TN.,RN.	OWNER	LEASE	TONS IN-SITU	STRIP RATIO	FED	GNP	HAUL DIST. one-way		OVBR BCY
34	2N.,39E.	FED	73109	4,293,000	5.80	4,293,000		10.11		24,899,400
3	1N.,39E.	GNP	MT002	5,039,000	9.15		5,039,000		2.98	46,106,850
2	1N.,39E.	FED	73109	130,000	5.21	130,000		9.02		677,300
1	1N.,39E.	GNP	MT002	3,495,000	9.27		3,495,000		3.78	32,398,650
4	1N.,40E.	FED	54712	426,000	8.32	426,000		5.00		3,544,320
9	1N.,40E.	GNP	MT002	2,244,000	8.77		2,244,000		5.08	19,679,880
				689,000	8.22		689,000		4.47	5,663,580
				24,000	6.10		24,000		4.09	146,400
				4,161,000	9.77		4,161,000		4.43	40,652,970
11	1N.,40E.	GNP	MT001	816,000	2.29		816,000		1.25	1,868,640
17	1N.,40E.	GNP	MT002	3,769,000	7.99		3,769,000		5.34	30,114,310
13	1N.,40E.	GNP	MT001	5,713,000	8.01		5,713,000		1.89	45,761,130
14	1N.,40E.	FED	73109	1,188,000	7.78	1,188,000		2.65		9,242,640
				275,000	6.73	275,000		2.23		1,850,750
15	1N.,40E.	GNP	MT001	1,256,000	6.87		1,256,000		3.60	8,628,720
	TOTAL FED					6,312,000		8.00		271,235,540
	TOTAL GNP						27,206,000		3.59	
	TOTAL			33,518,000	8.09			4.42		

UNLEASED FEDERAL RESERVES - BYPASSED

2	1N.,39E.	FED		626,000	7.63			8.83		4,776,000
				155,000	3.86			8.45		598,000
6	1N.,40E.	FED		15,564,000	4.49			6.40		69,882,000
32	2N.,40E.	FED		13,520,000	2.76			5.72		37,315,000
8	1N.,40E.	FED		788,000	6.38			5.49		5,027,000
				847,000	6.18			4.62		5,234,000
14	1N.,40E.	FED		2,018,000	8.18			2.27		16,507,000
	TOTAL			33,518,000	4.16			5.73		139,339,000
14	1N.,40E.	FED		2,018,000	8.11			2.68		16,366,000
				5,804,000	6.54					37,958,000

APPENDIX 7
PLANT SPECIES

Common Name	Scientific Name
Perennial Grasses:	
unknown wheatgrass	*Agropyron species*
crested wheatgrass	*Agropyron cristatum*
thickspike wheatgrass	*Agropyron dasystachyum*
tall wheatgrass	*Agropyron elongatum*
western wheatgrass	*Agropryon smithii*
bluebunch wheatgrass	*Agropyron spicatum*
pubescent wheatgrass	*Agropyron tricophorum*
sand bluestem	*Andropogon hallii*
red three-awn	*Aristida longiseta*
side-oats grama	*Bouteloua curtipendula*
blue grama	*Bouteloua gracilis*
smooth brome	*Bromus inermis*
mountain brome	*Bromus marginatus*
plains reedgrass	*Calamogrostis montanensis*
prairie sandreed	*Calamovilfa longifolia*
threadleaf sedge	*Carex filifolia*
sun sedge	*Carex pensylvanica*
Idaho fescue	*Festuca idahoensis*
prairie junegrass	*Koeleria cristata*
plains muhly	*Muhlenbergia cuspidata*
Indian ricegrass	*Oryzopsis hymenoides*
Canada bluegrass	*Poa compressa*
alkali bluegrass	*Poa juncifolia*
Kentucky bluegrass	*Poa pratensis*
Sandberg bluegrass	*Poa sandbergii*
little bluestem	*Schizachyrium scoparium*
sand dropseed	*Sporobolus cryptandrus*
needleandthread	*Stipa comata*
green needlegrass	*Stipa viridula*
Annual Grasses:	
Japanese brome	*Bromus japonicus*
cheatgrass brome	*Bromus tectorum*
six weeks grass	*Vulpia octoflora*
Perennial Forbs:	
western yarrow	*Achillea millefolium*
false dandelion	*Agoseris glauca*
wild onion	*Allium textile*
western ragweed	*Ambrosia psilostachya*
pussytoes	*Anternnaria parvifolia*
rose pussytoes	*Anternnaria rosea*

Common Name	Scientific Name
Perennial Forbs (cont.):	
rock cress	*Arabis holboellii*
sandwort	*Arenaria hookeri*
common sagewort	*Artemisia campestris*
false tarragon sagewort	*Artemisia dracunculus*
fringed sagewort	*Artemisia frigida*
cudweed sagewort	*Artemisia ludoviciana*
plains milkweed	*Asclepias pumila*
green milkweed	*Asclepias viridiflora*
unknown aster	*Aster species*
aster	*Aster campestris*
white prairie aster	*Aster falcatus*
unknown milkweed	*Astragalus species*
groundplum milkvetch	*Astragalus crassicarpu*
milkvetch	*Astragalus gilviflorus*
milkvetch	*Astragalus gracilis*
milkvetch	*Astragalus Missouriensis*
standing milkvetch	*Astragalus striatus*
balsamroot	*Balsamorhiza sagittata*
Wyoming kittentail	*Besseya wyomingensis*
butterfly	*Calochortus nuttallii*
bellflower	*Campanula rotundifolia*
downy paintbrush	*Castilleja sessiliflora*
field chickweed	*Cerastium arvense*
bastard toad flax	*Comandra umbellata*
field bindweed	*Convolvulus arvensis*
bindweed	*Convolvulus sepium*
tapertip hawksbeard	*Crepis acuminata*
black sampson	*Echinacea pallida*
horsetail	*Equisetem arvense*
few-flowered buckwheat	*Eriogonum pauciflorum*
spurge	*Euphorbia robusta*
nuttall evolvulus	*Evolvulus nuttalianus*
strawberry	*Frageria vesca*
blanketflower	*Gaillardia aristata*
northern bedstraw	*Galium boreale*
scarlet gaura	*Gaura coccinea*
prairie smoke	*Geum triflorum*
gilia	*Gilia congesta*
curlycup gumweed	*Grindelia squarrosa*
nuttall goldenweed	*Haplopappus nuttallii*
spiney goldenweed	*Haplopappus spinulosus*
hairy golden aster	*Heterotheca villosa*
hymenopappus	*Hymenopappus filifolius*
wild lettuce	*Lactuca pulchella*

Common Name	Scientific Name
Perennial Forbs (cont.):	
alkaline bladderpod	*Lesquerella alpina*
sand lily	*Leucocrinum montanum*
dotted gayflower	*Liatris punctata*
blue flax	*Linum perenne*
narrowleaf gromwell	*Lithospermum incisum*
desert parsley	*Lomatium macrocarpum*
rush skelton weed	*Lygodesmia juncea*
spiny aster	*Machaeranthera canescens*
little mallow	*Malva parviflora*
alfalfa	*Medicago sativa*
wild parsley	*Musineon divaricatum*
gumbo lily	*Oenothera caespitosa*
purple pointloco	*Oxtropis lambertii*
silky crazyweed	*Oxtropis sericea*
white penstemon	*Penstemon albidus*
beardtongue	*Penstemon eriantherus*
beardtongue	*Penstemon nitidus*
white prairie-clover	*Petalostemon candidum*
purple prairie-clover	*Petalostemon purpureum*
gland cinquefoil	*Phlox alyssifolia*
Hood's phlox	*Phlox hoodii*
white milkwort	*Polygala alba*
cinquefoil	*Potentilla glandulosa*
silverleaf scurfpea	*Psoralea argophylla*
common breadroot scurfpea	*Psoralea esculenta*
slimflower scurfpea	*Psoralea tenuiflora*
prairie coneflower	*Ratibida columnifera*
woolly groundsel	*Senecio canus*
false Solomon's seal	*Smilacina stellata*
Missouri goldenrod	*Solidago missouriensis*
goldenrod	*Solidago mollis*
goldenrod	*Solidago nemoralis*
stiff goldenrod	*Solidago rigida*
scarlet globemallow	*Sphaeralcea coccinea*
dandelion	*Taraxacum officinale*
prairie thermopsis	*Thermopsis rhombifolia*
bracted spiderwort	*Tradescantia bracteata*
stinging nettle	*Urtica diocia*
American vetch	*Vicia americana*
nuttall violet	*Viola nuttallii*
meadow death camus	*Zigadenus venenosus*
Annual Forbs:	
pale alyssum	*Alyssum alyssoides*
rock-jasmine	*Androsace occidentalis*
littlepod falseflax	*Camelina microcarpa*
wavyleaf thistle	*Cirsium undulatum*
collomia	*Collomia linearis*

Common Name	Scientific Name
Annual Forbs (cont.):	
miner's candle	*Cryptantha celosioides*
pinnate tansymustard	*Descurainia pinnata*
whitlow grass	*Draba nemorosa*
whitlow grass	*Draba reptans*
daisy fleabome	*Erigeron strigosus*
plains wallflower	*Erysimum asperum*
ridge-seeded spurge	*Euphorbia glyptosperma*
rough false pennyroyal	*Hedeoma hispida*
prickly lettuce	*Lactuca serriola*
prairie pepperweed	*Lepidium densiflorum*
stiffstem flax	*Linum rigidum*
yellow sweetclover	*Melilotus officinalis*
pellitory	*Parietaria pennsylvanica*
phacelia	*Phacelia linearis*
woolly plantain	*Plantago purshii*
tumblemustard	*Sisymbrium altissimum*
smallpod tumbleweed	*Sisymbrium loeselii*
salsify	*Tragopogon dubius*
Shrubs:	
serviceberry	*Amelanchier alnifolia*
bearberry	*Arctostaphylus uva-ursi*
silver sagebrush	*Artemisia cana*
big sagebrush	*Artemisia tridentata*
Nuttall saltbush	*Atriplex nuttallii*
Oregon grape	*Berberis repens*
winterfat	*Ceratoides lanata*
rubber rabbitbrush	*Chrysothamnus nauseosus*
red osier dogwood	*Cornus stolonifera*
horizontal juniper	*Juniperus horizontalis*
yellow pincushion cactus	*Mammilaris missouriensis*
shrubby evening primrose	*Oenothera serrulata*
brittle pricklypear	*Opuntia fragilis*
poison ivy	*Rhus radicans*
skunkbush sumac	*Rhus trilobata*
golden currant	*Ribes aureum*
squaw currant	*Ribes cereum*
prairie rose	*Rosa arkansana*
Wood's rose	*Rosa woodsii*
snowberry	*Symphoricarpos occidentalis*
broom snakeweed	*Xanthocephalum sarothrae*
yucca	*Yucca glauca*
Trees:	
hawthorn	*Craetagus succulenta*
Rocky Mountain juniper	*Juniperus scopulorum*
ponderosa pine	*Pinus ponderosa*
chokecherry	*Prunus virginiana*

Source: ECON 1983.

APPENDIX 8
ANIMAL SPECIES

Common Name	Scientific Name
Mammals:	
Elk (Wapiti)	*Cervus canadensis*
Mule deer	*Odocoileus hemionus*
Pronghorn antelope	*Antilocapra americana*
White-tailed deer	*Odocoileus virginianus*
Badger	*Taxidea taxus*
Bobcat	*Felis rufus*
Coyote	*Canis latrans*
Long-tail weasel	*Mustela frenata*
Mink	*Mustela vison*
* Mountain lion	*Felis concolor*
Raccoon	*Procyon lotor*
Red Fox	*Vulpes vulpes*
Striped skunk	*Mephitis mephitis*
Big brown bat	*Eptesicus fuscus*
Hoary bat	*Lasiurus cinereus*
Little brown bat	*Myotis lucifugus*
Long-eared myotis bat	*Myotis evotis*
Small-footed myotis bat	*Myotis leibii*
Masked shrew	*Sorex cinereus*
Desert cottontail rabbit	*Sylvilagus audobonii*
Mountain cottontail rabbit	*Sylvilagus nuttallii*
Whitetail jack rabbit	*Lepus townsendii*
Beaver	*Castor canadensis*
Blacktail prairie dog	*Cynomys ludovicianus*
Bushytail wood rat	*Neotoma cinerea*
House mouse	*Mus musculus*
Least chipmunk	*Tamias minimus*
Muskrat	*Ondrata zibethicas*
Northern pocket gopher	*Thomomys talpoides*
Porcupine	*Erethizon dorsatum*
Prairie vole	*Microtus ochrogaster*
Red squirrel	*Tamiasciurus hudsonicus*
Thirteen-lined ground squirrel	*Spermophilus tridecemlineatus*
Western deer mouse	*Peromyscus maniculatus*
Western harvest mouse	*Reithrodontomys megalotis*
Wyoming pocket mouse	*Perognathus fasciatus*
Yellowbelly marmot	*Marmota flaviventris*

Reptiles and Amphibians:

Tiger salamander	*Amoystoma tigrinum*
Great plains toad	*Bufo cognatus*
Leopard frog	*Rana pipiens*
Bull snake	*Pituophis melanoleucus*
Garter snake	*Thamnophis sp.*
Milk snake	*Lampropeltis triangulum*
Plains hognose snake	*Heterodon nasicus*
Prairie rattlesnake	*Crotalus viridus*
Sagebrush lizard	*Sceloporus graciosus*
Yellow-bellied racer	*Coluber constrictor*
Painted turtle	*Chrysemys picta*
Snapping turtle	*Chelydra serpentina*

Birds:

American widgeon	*Anas americana*
Blue-winged teal	*Anas discors*
Bufflehead	*Bucephala albeola*
Canada goose	*Branta canadensis*
Canvasback	*Aythya valisineria*
Cinnamon teal	*Anas cyanoptera*
Common goldeneye	*Bucephala clangula*
Common merganser	*Mergus merganser*
Gadwall	*Anas strepera*
Green-winged teal	*Anas carolinensis*
Hooded merganser	*Lophodytes cucullatus*
Lesser scaup	*Aythya affinis*
Mallard	*Anas platyrhynchos*
Northern shoveler	*Anas clypeata*
Pintail	*Anas acuta*
Redhead	*Aythya americana*
Ring-necked duck	*Aythya collaris*
Ruddy duck	*Oxyura jamaicensis*
Snow Goose	*Chen caerulescens*
Trumpeter swan	*Cygnus buccinator*
Wood duck	*Aix sponsa*
White-throated swift	*Aeronautes saxatalis*
Common nighthawk	*Chordeiles minor*
American avocet	*Recurvirostra americana*
Black tern	*Chlidonias niger*
Common snipe	*Gallinago gallinago*
Common tern	*Sterna hirundo*
Greater yellowlegs	*Tringa melanoleuca*
Killdeer	*Charadrius vociferus*
Lesser yellowlegs	*Tringa flavipes*
Long-billed curlew	*Numenius americanus*
Long-billed dowitcher	*Limnodromus scolopaceus*
Ring-billed gull	*Larus delawarensis*
Solitary sandpiper	*Tringa solitaria*
Spotted sandpiper	*Actitis macularia*
Upland plover	*Bartramia longicauda*
Willet	*Catoptrophorus semipalmatus*
Wilson's phalarope	*Phalaropus tricolor*

American bittern	*Botaurus lentiginosus*
Great blue heron	*Ardea herodias*
Mourning dove	*Zenaida macroura*
Rock dove	*Columba livia*
Belted kingfisher	*Ceryle alcyon*
Black-billed cuckoo	*Coccyzus erythropthalmus*
Yellow-billed cuckoo	*Coccyzus americanus*
American kestrel	*Falco sparverius*
Bald eagle	*Haliaeetus leucocephalus*
Cooper's hawk	*Accipiter cooperii*
Ferruginous hawk	*Buteo regalis*
Golden eagle	*Aquila chrysaetos*
Goshawk	*Accipiter gentilis*
Merlin	*Falco columbarius*
Northern harrier	*Circus cyaneus*
Osprey	*Pandion haliaetus*
Peregrine falcon	*Falco peregrinus*
Prairie falcon	*Falco mexicanus*
Red-tailed hawk	*Buteo jamaicensis*
Rough-legged hawk	*Buteo lagopus*
Sharp-shinned hawk	*Accipiter striatus*
Swainson's hawk	*Buteo swainsoni*
Turkey vulture	*Cathartes aura*
Gray partridge	*Perdix perdix*
Wild turkey	*Meleagris gallopavo*
Ring-necked pheasant	*Phasianus colchicus*
Sage grouse	*Centrocercus urophasianus*
Sharp-tailed grouse	*Tympanuchus phasianellus*
Common loon	*Gavia immer*
American coot	*Fulica americana*
Sandhill crane	*Grus canadensis*
Sora	*Porzana carolina*
American crow	*Corvus brachyrhynchos*
American goldfinch	*Carduelis tristus*
American redstart	*Setophaga ruticilla*
American robin	*Turdus migratorius*
Barn swallow	*Hirundo rustica*
Black-billed magpie	*Pica pica*
Black-capped chickadee	*Parus atricapillus*
Black-headed grosbeak	*Pheucticus melanocephalus*
Bohemian waxwing	*Bombycilla garrulus*
Brewer's blackbird	*Euphagus cyanocephalus*
Brewer's sparrow	*Spizella breweri*
Brown-headed cowbird	*Molothrus ater*
Brown thrasher	*Toxostoma rufum*
Bullock's oriole	*Icterus galbula bullockii*
Catbird	*Dumetella carolinensis*
Cedar waxwing	*Bombycilla cedrorum*
Chipping sparrow	*Spizella passerina*
Clark's nutcracker	*Nucifraga columbiana*
Clay-colored sparrow	*Spizella pallida*
Cliff swallow	*Hirundo pyrrhonata*
Common grackle	*Quiscalus quiscula*
Common redpoll	*Carduelis flammea*
Dusky flycatcher	*Empidonax oberholseri*

Eastern kingbird	*Tyrannus tyrannus*
Evening grosbeak	*Coccothraustes vespertina*
Grasshopper sparrow	*Ammodramus savannarum*
Gray-crowned rosy finch	*Leucosticte arctoa*
Horned lark	*Eremophila alpestris*
House sparrow	*Passer domesticus*
House wren	*Troglodytes aedon*
Lark bunting	*Calamospiza melanocorys*
Lark sparrow	*Chondestes grammacus*
Loggerhead shrike	*Lanius ludovicianus*
McCown's longspur	*Calcarius mccownii*
Mountain bluebird	*Sialia currucoides*
Myrtle warbler	*Dendroica coronata*
Northern shrike	*Lanius excubitor*
Ovenbird	*Seiurus aurocapillus*
Pine siskin	*Carduelis pinus*
Pinyon jay	*Gymnorhinus cyanocephalus*
Purple martin	*Progne subis*
Red-breasted nuthatch	*Sitta canadensis*
Red crossbill	*Loxia curvirostra*
Red-winged blackbird	*Agelaius phoeniceus*
Rock wren	*Salpinctes obsoletus*
Rough-winged swallow	*Stelgidopteryx ruficollis*
Rufous-sided towhee	*Pipilo erythrophthalmus*
Savannah sparrow	*Passerculus sandwichensis*
Say's phoebe	*Sayornis saya*
Slate-colored junco	*Junco hyemalis*
Snow bunting	*Plectrophenax nivalis*
Solitary vireo	*Vireo solitarius*
Song sparrow	*Melospiza melodia*
Starling	*Sturnus vulgaris*
Townsend's solitaire	*Myadestes townsendii*
Tree swallow	*Tachycineta bicolor*
Vesper sparrow	*Pooecetes gramineus*
Violet-green swallow	*Tachycineta thalassina*
Western kingbird	*Tyrannus verticalis*
Western meadowlark	*Sturnella neglecta*
Western tanager	*Piranga ludoviciana*
Western wood peewee	*Contopus sordidulus*
White-breasted nuthatch	*Sitta carolinensis*
White-crowned sparrow	*Zonotrichia leucophrys*
Yellow-breasted chat	*Icteria virens*
Yellow-headed blackbird	*Xanthocephalus xanthocephalus*
Yellowthroat	*Geothlypis trichas*
Yellow warbler	*Dendroica petechia*
Double-crested cormorant	*Phalacrocorax auritus*
White pelican	*Pelecanus erythrorhynchos*
Common flicker	*Colaptes auratus*
Downy woodpecker	*Picoides pubescens*
Hairy woodpecker	*Picoides villosus*
Red-headed woodpecker	*Melanerpes erythrocephalus*
Eared grebe	*Podiceps nigricolis*
Horned grebe	*Podiceps auritus*
Pied-billed grebe	*Podilymbus podiceps*
Western grebe	*Aechmophorus occidentalis*

Borrowing owl	*Athene cunicularia*
Great horned owl	*Bubo virginianus*
Long-eared owl	*Asio otus*
Screech owl	*Otus asio*
Short-eared owl	*Asio flammeus*

* Mountain lion: one observation reported by local person in the spring of 1983.

APPENDIX 9
CULTURAL RESOURCES AND TRADITIONAL LIFEWAY VALUES

INTRODUCTION

Cultural resources are defined as a broad, general term meaning any cultural property or any traditional lifeway value.

CULTURAL PROPERTY. Is a definite location of past human activity, occupation or use identifiable through field inventory (survey), historical documentation or oral evidence. The term includes archeological, historical or architectural sites, structures or places with important public and scientific uses and may include traditional cultural or religious importance to specified social and/or cultural groups. Cultural properties are concrete, material places and things that are classified, ranked and managed through the system of inventory, evaluation, planning, protection and utilization (USDI, BLM 1991c).

TRADITIONAL LIFEWAY VALUE. Is the quality of being useful in or important to the maintenance of a specified social and/or cultural group's traditional systems of religious belief, cultural practice or social interaction, not closely identified with definite locations. Another group's shared values are abstract, nonmaterial, ascribed ideas that one cannot know about without being told. Traditional lifeway values are taken into account through public participation during planning and environmental analysis (USDI, BLM 1991c).

An additional concept exists for cultural resources that is intermediate between the above two definitions. This is a traditional cultural property.

TRADITIONAL CULTURAL PROPERTY. Sites, objects, districts, or landscapes that qualify for nomination to the National Register of Historic Places from the perspective of Indian history and culture based on their association with events that made a significant contribution to the broad patterns of history (criterion A), association with a culturally significant individual (criterion B), embodiment of the distinctive characteristics of a type, period, or method of construction (criterion C), or the potential to yield important information about the history or prehistory of the area (criterion D) (USDI, NPS 1990).

A traditional cultural property is also a specific, definite place that figures directly and prominently in a particular group's cultural practices, beliefs or values, when those (a) are widely shared within the group, (b) have been passed down through generations, and (c) serve a recognized role in maintaining the group's cultural identity.

Such a place, which might otherwise be undistinguished physically and historically, could derive a measure of historical importance just from the fact that the group has attached special meaning to it for many years. If criteria in 36 CFR 60.4 are met, such a place could be found eligible for the National Register of Historic Places (USDI, BLM 1992c).

A traditional cultural property is also defined as:

> locations which are believed to possess spiritual qualities relating to the origin of a Native American group, its cultural history or the nature of the world;
>
> or a rural community whose organization, buildings and structures or patterns of land use reflect the cultural traditions valued by its long-term residents;
>
> or an urban neighborhood that is the traditional home of particular cultural groups, and that reflect its beliefs and practices;
>
> or a location where Native American religious practitioners have historically gone, and are known or thought to go today, to perform ceremonial activities in accordance with traditional cultural rules of practice;
>
> and a location where a community has traditionally carried out economic, artistic or other cultural practices important in maintaining its historic identity (USDI, BLM 1993a).

These places, which might otherwise be undistinguished physically and historically, could derive a measure of historical importance just from the fact that the group has attached special meaning to it for many years. If criteria in 36 CFR 60.4 are met, such a place could be found eligible for the National Register of Historic Places (USDI, BLM 1992c).

The National Park Service's Bulletin No. 38 (USDI, NPS 1992) provides guidelines for evaluating traditional cultural properties as historic properties eligible for listing on

the National Register of Historic Places under criteria A, B and C. Prehistoric sites may now be evaluated from the perspectives of tribal history and culture. Sites, artifacts, landscapes and districts which qualify under the criteria, from the perspective of Indian history and culture, are considered traditional cultural properties.

The ethnographic study by Kooistra-Manning and Others (1993) explicitly defined how sites with traditional cultural property values would be evaluated for National Register eligibility.

> In order for an object, site, district or landscape to be recommended as a traditional cultural property eligible under criterion A, association with events that have made a significant contribution to the broad patterns of history, it had to possess the following elements or registration requirements:
>
> 1. Ethnohistoric and/or oral history data that demonstrates a tie between the property and the event that took place either during historical linear time or mythological (qualitative, non-linear) time;
>
> 2. The event must either be associated with a specific moment in history that has cultural significance for the group or be a broad pattern or theme which acts as a legitimizing charter for continuing cultural activities or explaining past cultural activities; and
>
> 3. The property must contain culturally recognizable features (natural or constructed) which serve as symbols for the event.
>
> In order for an object, site, district or landscape to be recommended as a traditional cultural property eligible under criterion B, association with a culturally significant individual, it must possess the elements:
>
> 1. Ethnohistoric and/or oral history data that demonstrates a tie between the property and the person, human or mythological;
>
> 2. The person must either be associated with a specific cultural institution or practice that has cultural significance for the group (clan, moiety, band, tribe, etc.); and
>
> 3. The property must contain culturally recognizable features (natural or constructed) which serve as symbols for the person.
>
> In order for an object, site, district or landscape to be recommended as a traditional cultural property eligible under criterion C, embodiment of the distinctive characteristics of a type, period or method of construction, it must possess the following elements:
>
> 1. Ethnohistoric and/or oral history data that demonstrates a tie between the cultural group (tribe, clan, band, warrior society, etc.) and the type, method or period of construction of the specialized feature or site;
>
> 2. The structure or feature must either be associated with a specific cultural institution or practice that has cultural significance for the group (clan, moiety, band, tribe, etc.); and
>
> 3. The property must retain the culturally recognizable features indicative of the cultural group.

Locations without an archeological component may also qualify as a traditional cultural property as long as there is a close association to major events or themes in tribal history and culture. Non-archeological localities most likely to qualify as traditional cultural properties include:

> 1. Geological features, for example, points of origin, which are associated with important events in tribal history and culture. These may qualify as traditional cultural properties under criterion A.
>
> 2. Medicinal and ceremonial resource gathering areas, which are closely tied with major themes in tribal history and continued traditional practices, may qualify as traditional cultural properties under criteria A or C. These are properties with resources that are critical to ongoing medicinal and ceremonial traditions and that serve as a contemporary marker of ethnic identity, cultural continuity and heritage.

In order for a site, object, district or landscape to be recommended for listing as a Traditional Cultural Property, it must also demonstrate two types of integrity: integrity of relationship and integrity of condition.

Integrity of relationship is established by demonstrating that the property is recognized by contemporary groups as being important in their cultural heritage. This is generally accomplished by collecting oral histories and written documents which establish the tie between the group and the site. The tie established must generally be at least 50 years old.

Integrity of condition is established by demonstrating that the physical nature of the site is sufficiently intact that the qualities which make the site significant to the traditional group are still present and recognized. Both types of integrity are necessary for a site to be recommended as eligible as a traditional cultural property.

Impacts to the spirits associated with traditional cultural property sites are covered by the National Historic Preservation Act (Kooistra-Manning and Others 1993).

INTANGIBLE SPIRITUAL ATTRIBUTES are sites or locales that possess a form of individual spirituality recognized by Native American traditional religious practitioners. Although these places possess spiritual attributes, they are not covered by the National Historic Preservation Act and are not eligible for the National Register of Historic Places as traditional cultural properties. Sites with intangible spiritual attributes are not considered traditional cultural properties as they do not meet the requirements of a "property" because they do not contain specialized features which indicate ceremonial use or which can be associated with traditional cultural practices, events or important individuals. Respectful treatment is appropriate to avoid lasting adverse impacts to the spiritual qualities associated with these places.

Impacts to the spirits associated with sites with intangible spiritual attributes are addressed through compliance with the American Indian Religious Freedom Act and the National Environmental Policy Act. Respectful treatment is appropriate to avoid lasting adverse impacts to the spiritual qualities associated with these places (Kooistra-Manning and Others 1993).

CONTEMPORARY USE AREAS are prayer and offering locales which are currently in use for ceremonial purposes, or locations from which resources are gathered for medicinal and ceremonial uses. Current use can occasionally be recognized by offerings of tobacco, prayer cloths, feathers and braided sweetgrass left at a site or locale. Impacts to contemporary religious practices are also addressed in compliance with the American Indian Religious Freedom Act and the National Environmental Policy Act (Kooistra-Manning and Others 1993).

APPENDIX 10
HYDROLOGIC IMPACTS OF MINING FEDERAL COAL

HYDROLOGIC IMPACTS OF MINING FEDERAL COAL IN AREAS B AND C OF THE ROSEBUD MINE, COLSTRIP MT.

SUMMARY OF POTENTIAL IMPACTS

This report summarizes potential impacts to the hydrologic system as the result of proposed mining of Federal coal in areas B and C of the Rosebud mine. The information presented here is based on the final comprehensive EIS for the Rosebud Mine (1983), the PER/EA for Area C of the Rosebud Mine (1988),data submitted by Western Energy, MBMG Coal Hydrology Database, and several MBMG published reports. This report summarizes impacts by answering and discussing several questions posed by the BLM in a letter dated 12/7/93.

1. ARE THE DATA IN THESE DOCUMENTS CURRENT AND ACCURATE? (referring to the 1983 EIS and the 1988 PER/EA and other data sources).

The data included in these reports are largely from the late 1970's and early 1980's. As a result, changes in summary statistics and hydrologic trends used for interpretation are not complete. More continuous water-quality data and water-level data are currently available. It is unlikely that the new information will significantly change summaries of aquifer water quality as shown on page 6 of the PER/EA (1988).

The current post-impact database has effectively doubled since these reports were written. Hydrologic monitoring has been conducted by both mining companies and the MBMG, adjustments in predictions should be assessed and certain interpretations may require re-evaluation. Updated MBMG hydrologic monitoring data combined with company data in nearby areas or similar settings will provide the background data for reevaluating the predicted hydrologic impacts. Water-level fluctuations in several MBMG monitor wells display typical hydrologic responses to coal mining. All MBMG wells discussed in this report are plotted on Figure 1. Hydrographs of 9 wells in the vicinity of Area C are shown in Figures 2 to 4. Additional data from WECo annual reports also provided background information.

2.DID THE ANTICIPATED IMPACTS OCCUR, AND IF THEY DID, WITH THE EXPECTED RESULTS?--THE ANTICIPATED IMPACTS ARE TAKEN FROM THE 1983 EIS DISCUSSION --IMPACTS THROUGH 1987.

A. Ground-water flow

Predicted impacts to ground-water flow as the result of mining was originally summarized by the following statement. "The spoils aquifer will have similar horizontal hydraulic conductivity but a higher vertical conductivity causing an increased recharge potential. The effective porosity will also increase, increasing the ground-water storage".

It is too early to verify all of these impacts. Mine spoils are resaturating with aquifers being established. In some areas what appear to be basal spoils aquifers are forming. The following hydrographs from spoils wells depict resaturation (Figure 5). The

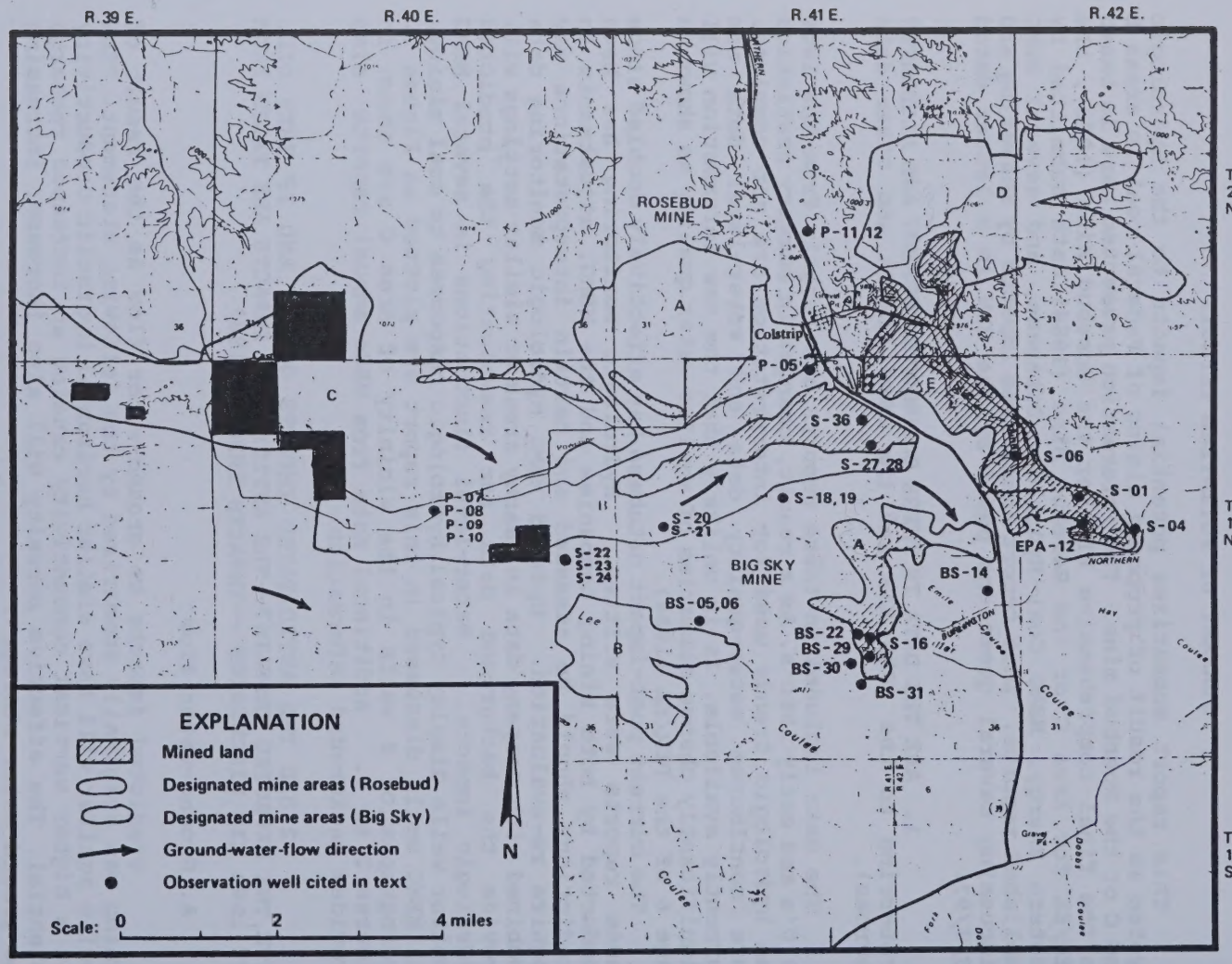


Figure 1.—Many wells are monitored in and near the Rosebud and Big Sky mines. Those mentioned in this report are shown here.

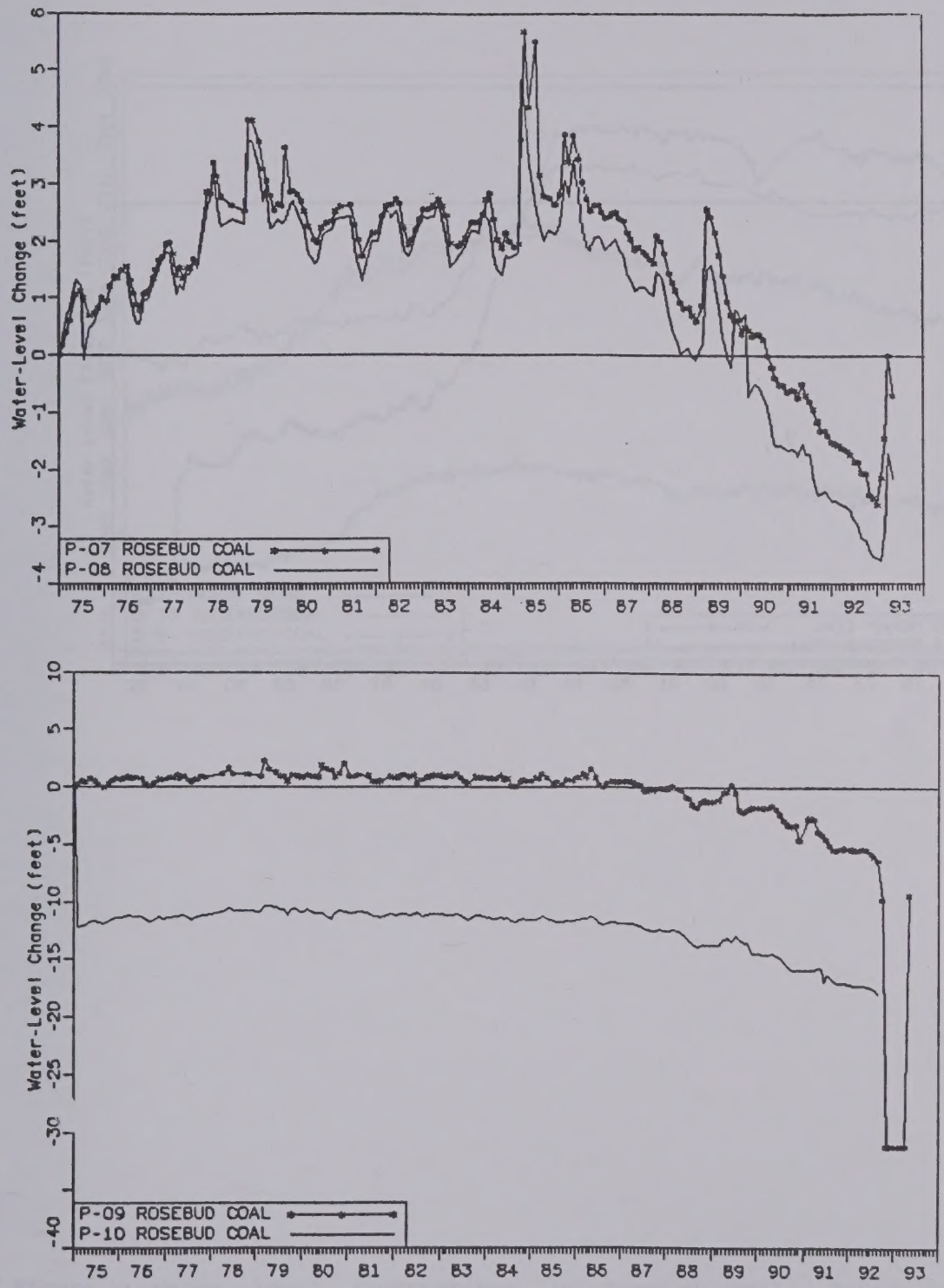


Figure 2. Water-level fluctuations in Rosebud coal aquifer in the vicinity of proposed federal leases in Area C of the Rosebud Mine.

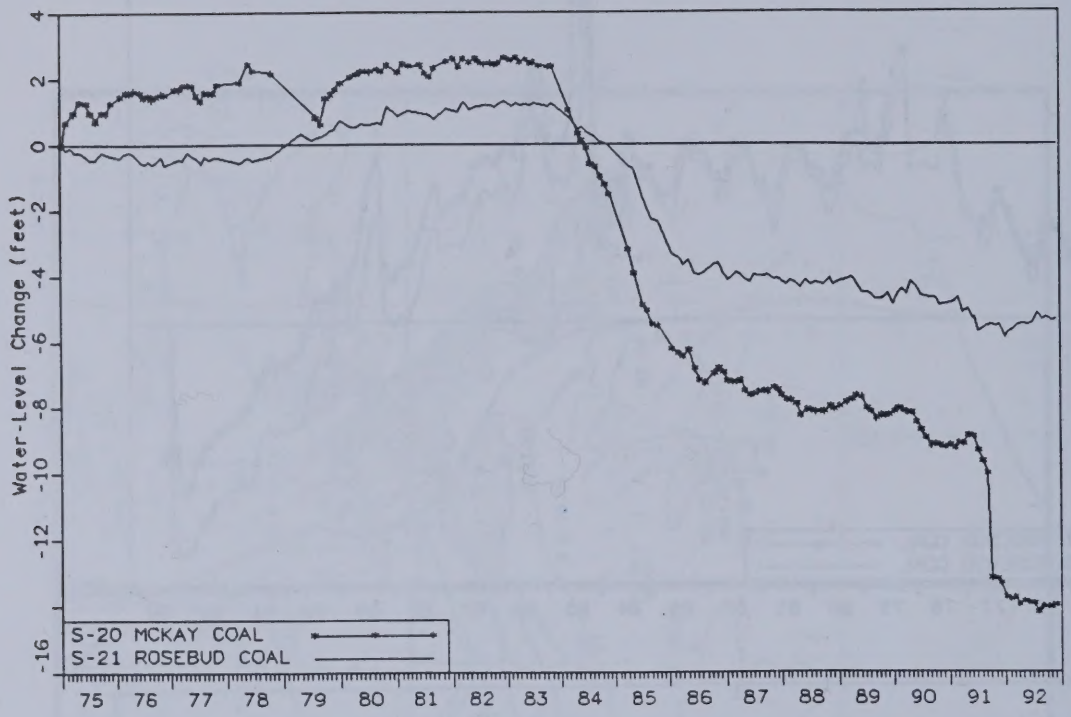


Figure 3. Water-level fluctuations in the Rosebud and McKay coal aquifers in the vicinity of proposed federal leases in Area C of Rosebud Mine.

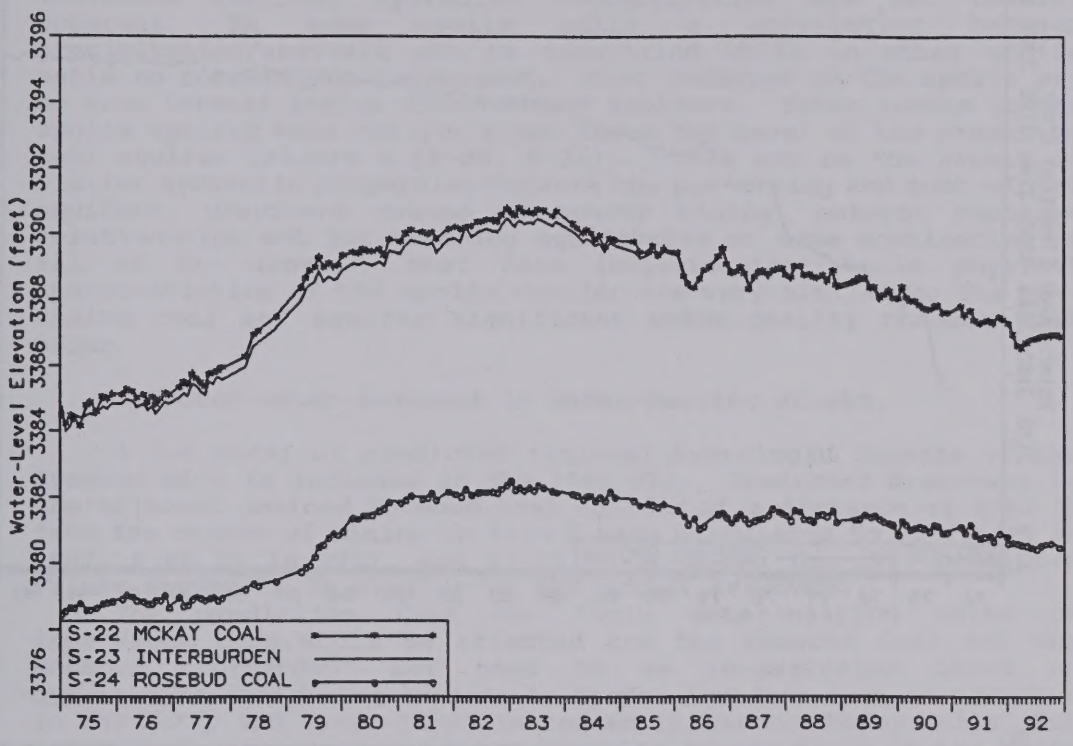


Figure 4. Water-level fluctuations in Rosebud coal, McKay coal, and interburden aquifers between Area C of the Rosebud Mine and Area B of the Big Sky Mine.

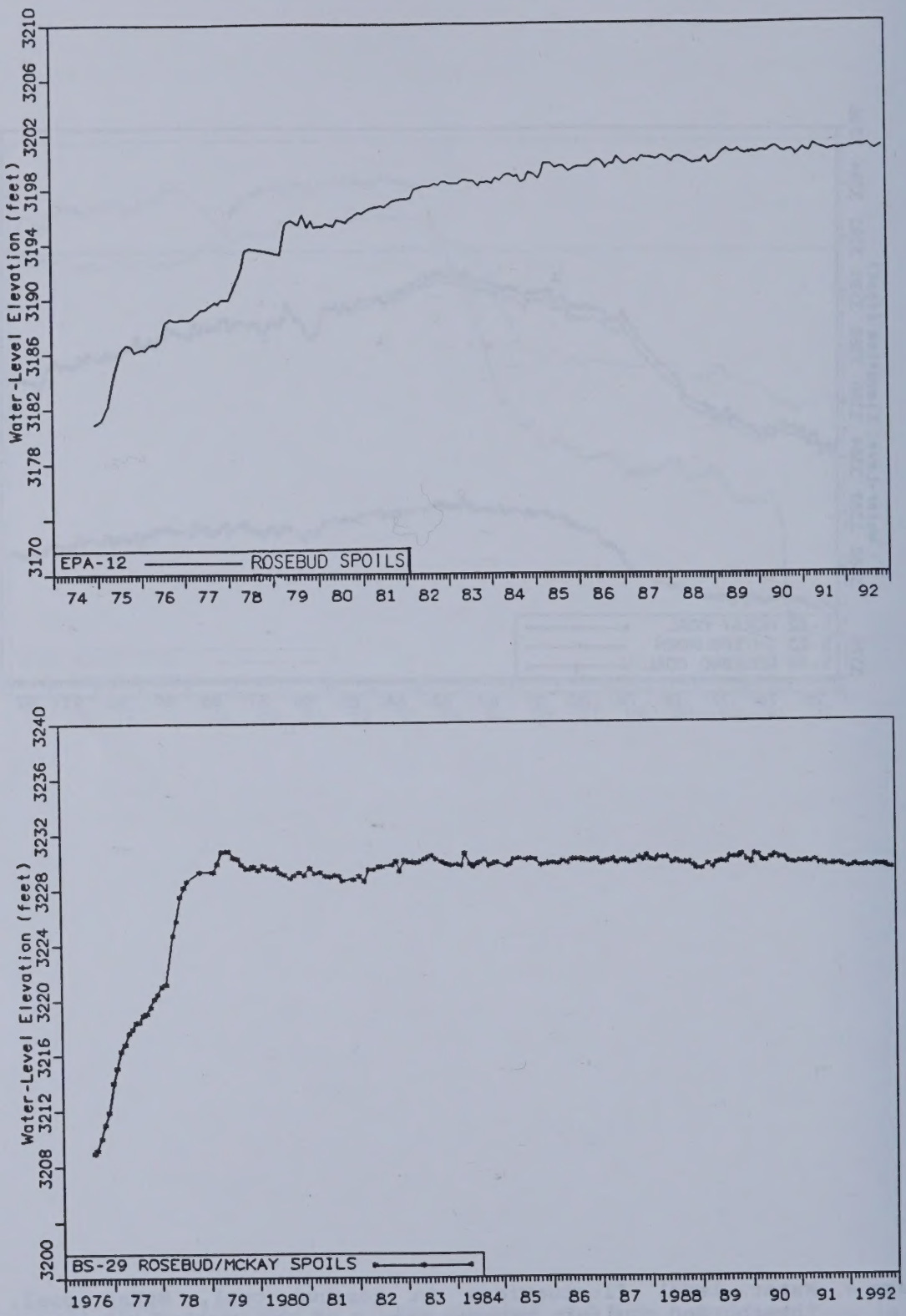


Figure 5. Hydrographs depicting resaturation of spoils in the Colstrip area.

range of aquifer properties within the spoils are similar to premining conditions (Van Voast and Reiten, 1988). The impacts of increased vertical hydraulic conductivities are not readily apparent. In some spoils wells a correlation between precipitation/snowmelt can be identified while in other spoils wells no correlation is present. Most recharge to the spoils may be from lateral inflow from bedrock aquifers. Water levels in the spoils aquifer have not yet risen above the level of the premining coal aquifer (Figure 6 [S-28, S-36]). This may be the result of similar hydraulic properties between the pre-mining and post-mining aquifers, drawdowns caused by nearby mining, natural recharge relationships not yet reaching equilibrium or some combination of all of the above. Most data indicate that while physical characteristics of the spoils aquifer are very similar to the pre-mining coal bed aquifer significant water-quality changes will occur.

Ground-water movement in water-bearing strata.

A 3-D model of predicted regional hydrologic impacts of the Rosebud mine is included in the 1983 EIS. Predicted drawdowns in the adjacent unmined Rosebud coal aquifer at a distance of 4000 ft from the center of mining in Area C were calculated to be 3-4 ft in 1987, 8-60 ft in 2017, and 23-35 ft in 2118. The 1987 predicted values appear to be similar to the actual drawdown.

The prediction that the "only water-bearing units of importance that would be affected are the Rosebud coal and the Rosebud overburden" may need to be re-evaluated based on hydrographs indicating impacts to deeper aquifers such as drawdown in the McKay and water-level increases in the sub-McKay units. For example, Figures 3, 7 and 8 are examples of drawdowns in the McKay aquifer that relate to encroaching mine pits. These figures show fluctuations in both the Rosebud and McKay wells. In many cases greater drawdown is evident in the deeper, unmined McKay aquifer than the Rosebud aquifer. The cause of this anomolous relationship has yet to be defined but may have serious impacts to deeper unmined aquifers. The most likely cause of this vertical connection appears to be seepage of water through poorly plugged exploration boreholes and seepage of water through failed well seals. A strong potential exists for negative impacts (degraded water quality) to affect the sub-McKay sandstone aquifers which have been commonly suggested as the best source for replacing mined out water supplies.

Recharge/discharge relationships.

Predicted impacts to recharge /discharge relationships include impairment to aquifers during mining, with mine pits locally dewatering near surface aquifers causing temporary decreased ground-water discharge to surface-water bodies. Much of this water will be diverted into surface water below the area actively being mined. There are data from other regions indicating significant increases in base flow of streams flowing through mine spoils. In addition, base flow from the spoils, will probably contain higher dissolved-solids concentrations than from unmined materials. It is very likely that such increases will occur in the Colstrip area, although no such increases have been documented. These increases are caused by the increased infiltration rates and storage in the nonlayered spoils than in undisturbed layered sedimentary rocks.

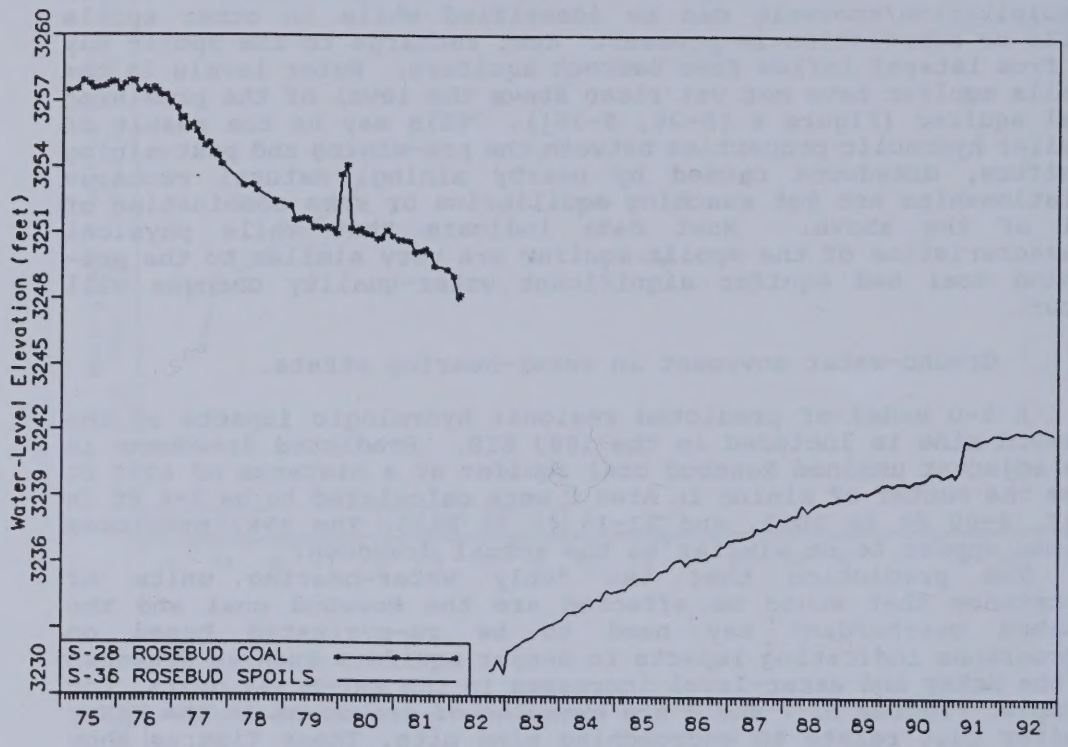


Figure 6. Hydrograph showing relationship of pre-mining water-level elevation in the Rosebud coal aquifer and post mining water-level elevation in the mine spoils.

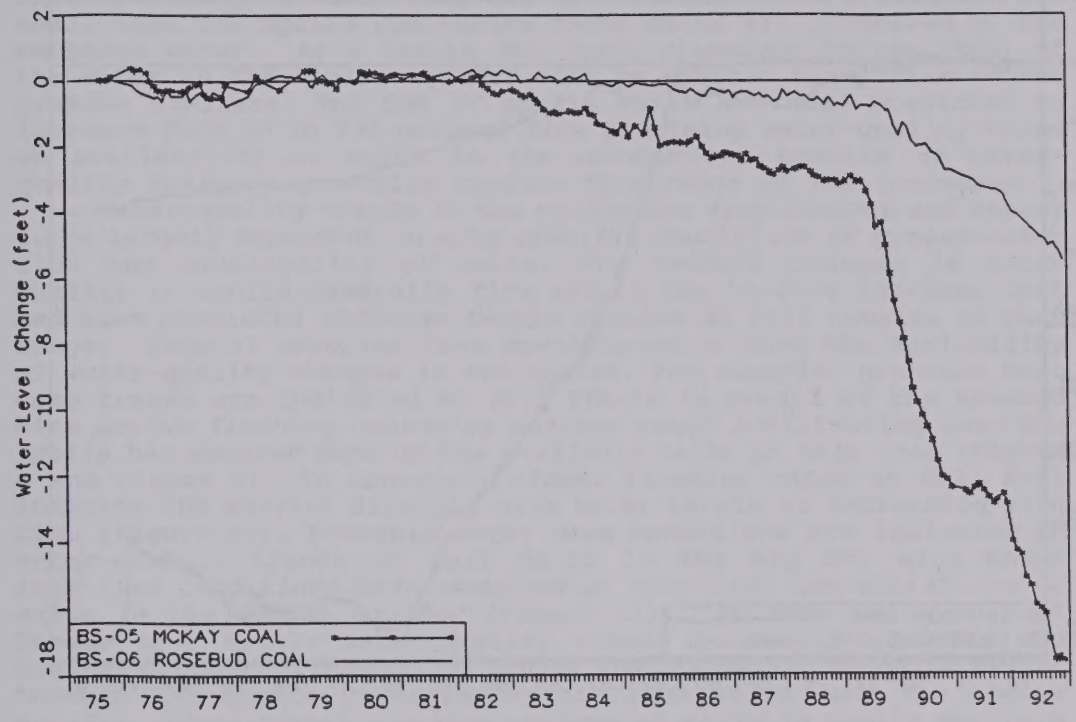


Figure 7. Hydrograph depicting mining impacts to the McKay and Rosebud coal aquifers at BS-05 and BS-06. Drawdowns in the unmined McKay coal are greater than the Rosebud coal which is being mined nearby.

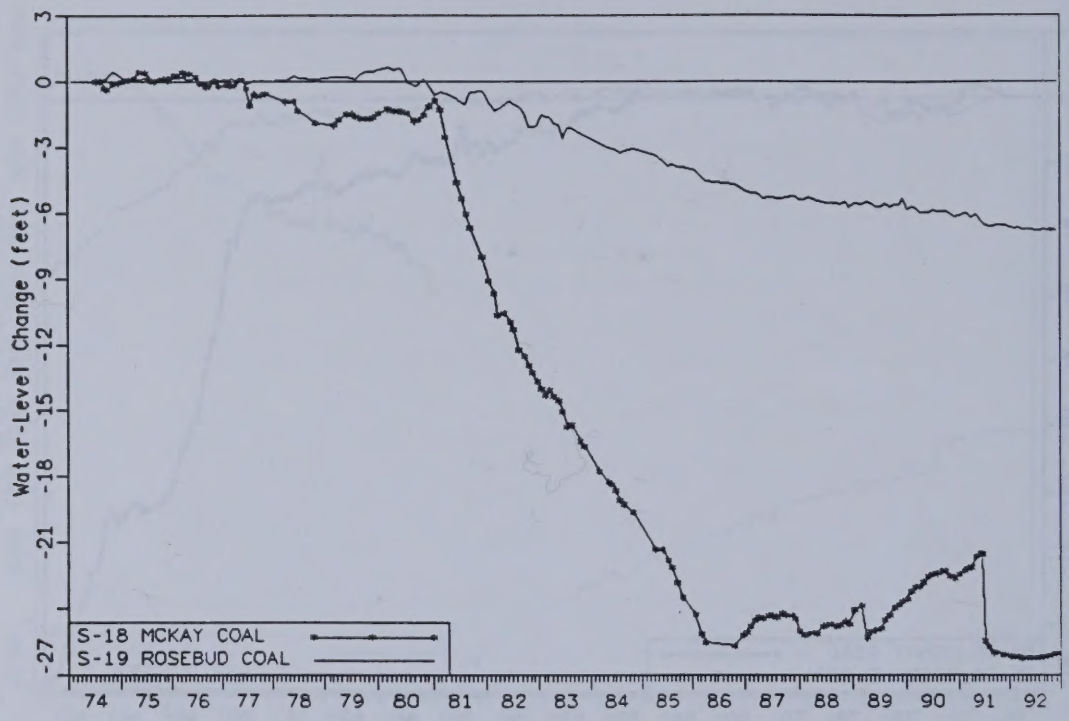


Figure 8. Hydrograph depicting mining impacts to the McKay and Rosebud coal aquifers at S-18 and S-19. Drawdowns in the unmined McKay coal are greater than the Rosebud coal which is being mined nearby.

B. Ground-water quality

Spoils

Mining is predicted to increase the availability of soluble salts in the spoils over what was in the undisturbed overburden and coal. When the spoils resaturate these salts are dissolved by the recharge water. As a result the Total Dissolved Solids (TDS) of the water in the spoils aquifer will be greater than water in the premine aquifers. The TDS of spoils water has been predicted to increase from 50 to 200 percent from premining water-quality based on availability of salts in the overburden. Results of water-quality analyses generally confirm this range of TDS increases.

Water-quality trends in the spoils are very diverse and appear to be largely dependent on site specific conditions of ground-water flow and availability of salts. The overall changes in water quality in spoils generally fits within the 50-200% increase that had been predicted although sample results do fall outside of that range. Several examples from specific wells show the variability of water-quality changes in the spoils. For example, probable best case trends are indicated at well EPA-12 in Area E of the Rosebud Mine active flushing caused by surface water infiltrating into the spoils has removed much of the available salts in this area (Figure 6 and Figure 9). In contrast, slower flushing rates at well S-01 indicate TDS varying directly with water levels or increasing with time (Figure 10). Probable worst case conditions are indicated in water-quality trends at well BS-22 in the Big Sky mine where localized conditions have resulted in very high concentrations of salts in the spoils aquifer (Figure 11). At some wells in West Decker mine spoils water-quality trends in spoils aquifers are towards decreasing concentrations of TDS indicating recharge moving through the spoils is beginning to flush salts from the spoils aquifer. These trends are less obvious at wells in spoils aquifers near Colstrip but are likely to occur at least in some places with the major unknown factor being the timing.

Spoils water moving under normal gradients was predicted to degrade downgradient alluvial and bedrock aquifers. The predicted offsite degradation caused by migrating spoils water has not been clearly documented. Although some degradation has been observed, it appears to be less than originally anticipated. The ultimate destination of the salt load being carried by the spoils water remains unclear but must be off site either to adjacent or deeper aquifers.

Rosebud coal

The Rosebud coal will be removed and replaced with spoils in the mine area. When ground-water flow patterns are reestablished, spoils water will enter the adjacent unmined areas and are predicted to degrade the water quality in the Rosebud aquifer. This water will displace fresher water in the unmined portions of the coal bed and similar water-quality trends as identified in the spoils aquifers that were discussed in the previous section are likely to occur.

Rosebud/McKay interburden

Fine-grained sandstones in the Rosebud/Mckay interburden locally contain water, but these water-bearing zones are of limited

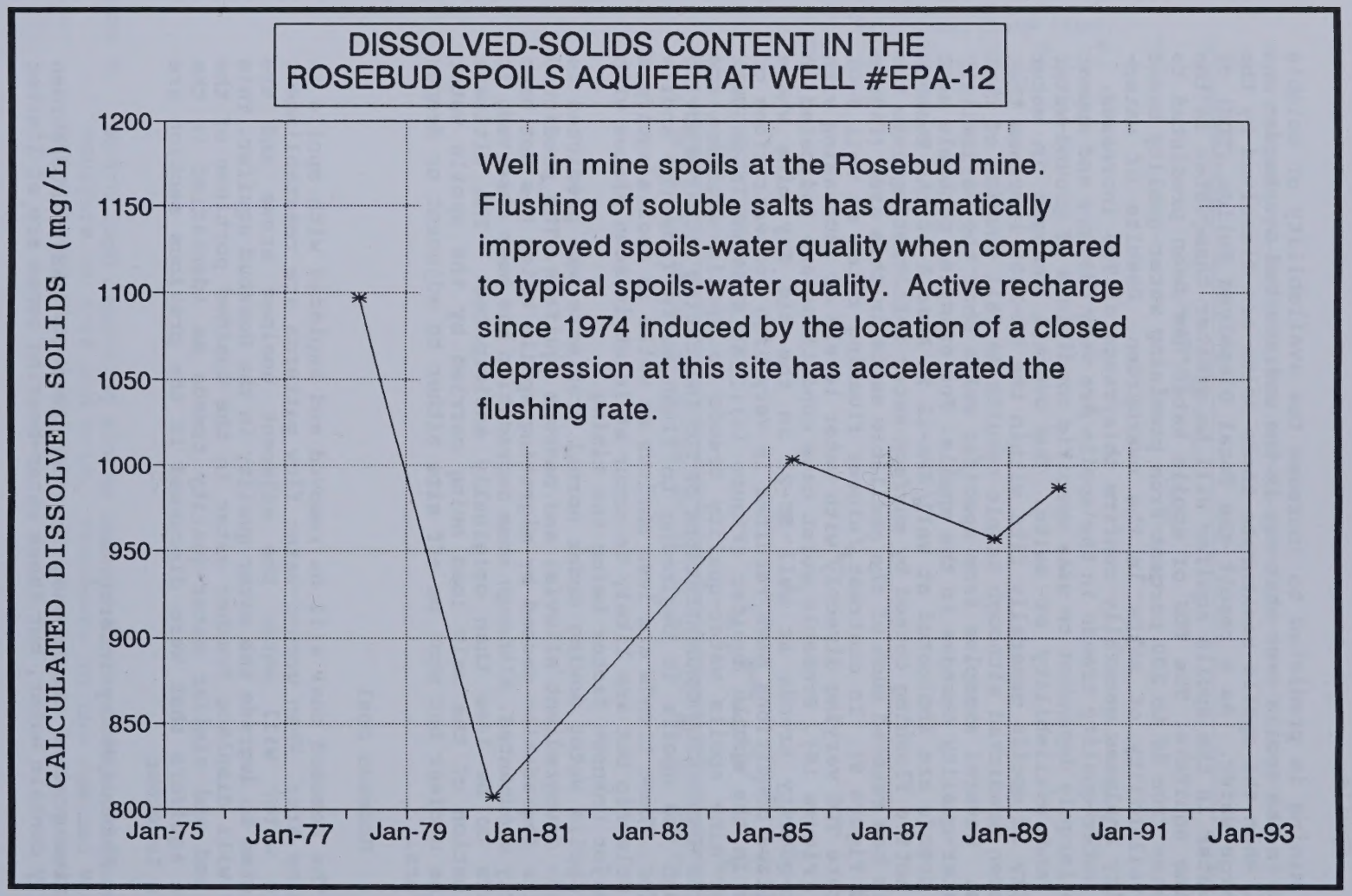
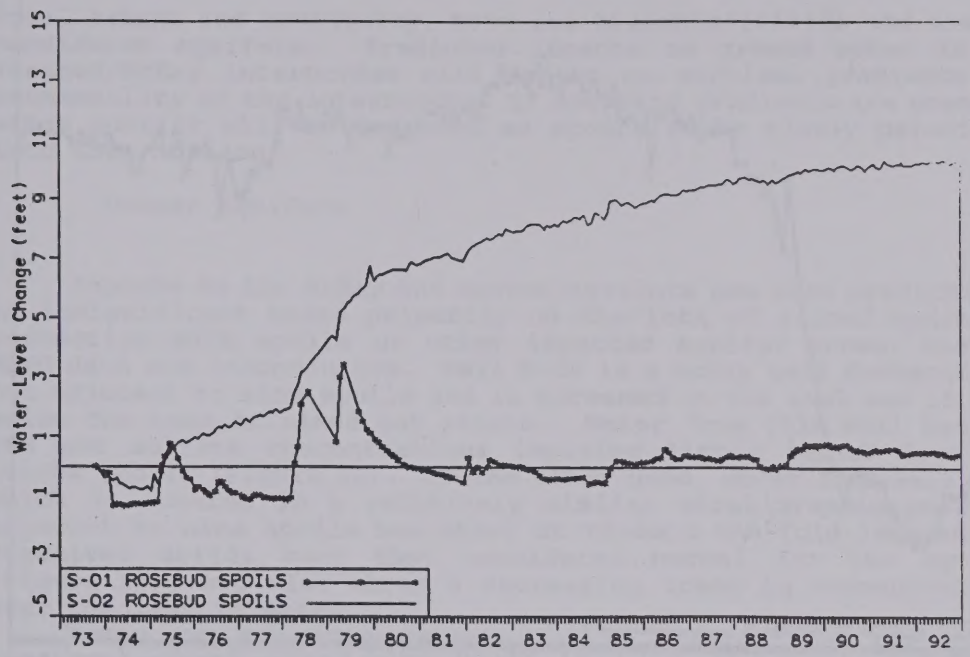


Figure 9. Dissolved-solids content in the Rosebud spoils aquifer at well EPA-12.

a.



b.

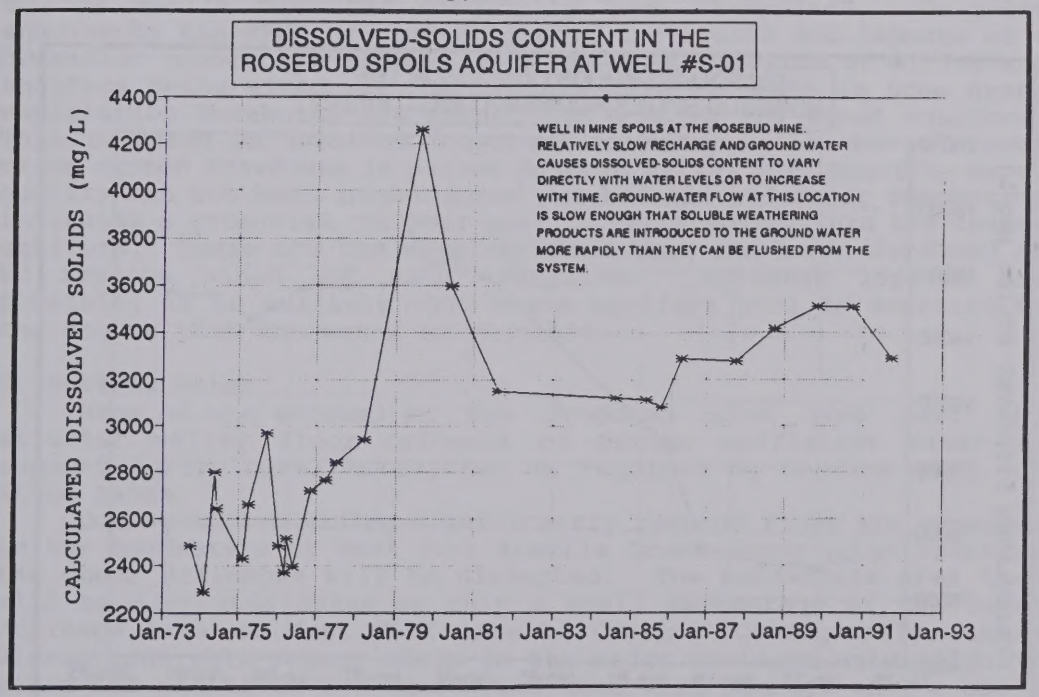
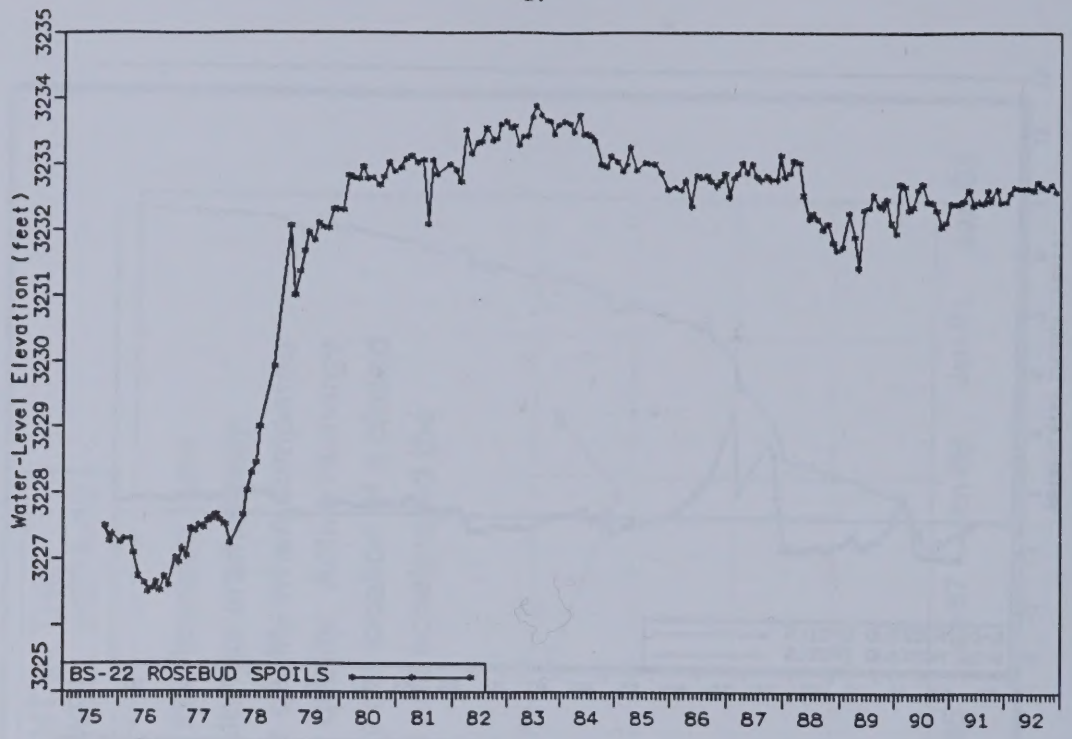

DISSOLVED-SOLIDS CONTENT IN THE ROSEBUD SPOILS AQUIFER AT WELL #S-01
CALCULATED DISSOLVED SOLIDS (mg/L)
4400
4200
4000
3800
3600
3400
3200
3000
2800
2600
2400
2200
WELL IN MINE SPOILS AT THE ROSEBUD MINE. RELATIVELY SLOW RECHARGE AND GROUND WATER CAUSES DISSOLVED-SOLIDS CONTENT TO VARY DIRECTLY WITH WATER LEVELS OR TO INCREASE WITH TIME. GROUND-WATER FLOW AT THIS LOCATION IS SLOW ENOUGH THAT SOLUBLE WEATHERING PRODUCTS ARE INTRODUCED TO THE GROUND WATER MORE RAPIDLY THAN THEY CAN BE FLUSHED FROM THE SYSTEM.
Jan-73 Jan-75 Jan-77 Jan-79 Jan-81 Jan-83 Jan-85 Jan-87 Jan-89 Jan-91 Jan-93

Figure 10. Hydrographs of (a) water-level fluctuations in the Rosebud spoils at wells S-01 and S-02, and (b) dissolved-solids content in the spoils aquifer at well S-01.

a.



b.

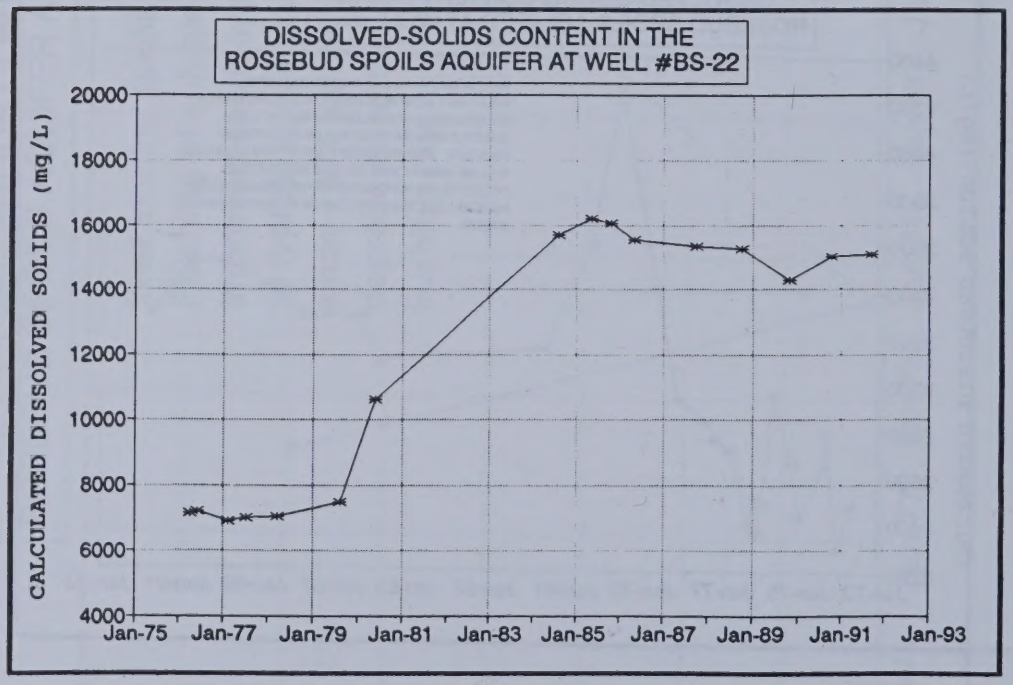


Figure 11. Hydrograph depicting (a) resaturation of spoils at well BS-22 and (b) dissolved-solids content in the spoils aquifer at the same well. High dissolved-salt concentrations are very localized.

areal extent and continuity, have low transmissivities,and are not considered aquifers. Predicted impacts on ground water in the Rosebud/McKay interburden will depend on vertical gradients and permeability of the interburden. If downward gradients are present, water quality will be degraded as spoils water slowly percolates into this horizon.

Deeper aquifers

Impacts to the McKay and deeper aquifers has been predicted to be insignificant based primarily on the lack of a good hydraulic connection with spoils or other impacted aquifer zones. Current MBMG data are inconclusive. Well S-06 is a McKay well downgradient but adjacent to mine spoils and is screened in the coal bed 15 feet below the base of mined out strata. Water from this well has low TDS and sulfate concentrations implying little impact from the nearby spoils (Figure 12). On the other hand, water from well S-04 which is located in a relatively similar stratigraphic position adjacent to mine spoils has shown at times a ten-fold increase in dissolved solids over that considered normal for the aquifer (Figure 13), but also shows a decreasing trend in concentrations over the last 15 years.

McKay and sub-McKay impacts may be greater than previously predicted, based on the indications of better hydraulic connection to the spoils than had originally been determined. On-going studies by the MBMG are investigating the source and impacts of a hydraulic connection between aquifers below the zone of mining and aquifers being mined out. It appears that at least in some areas exploration boreholes are connecting unmined and mined aquifers. This is based on observed drawdowns in McKay wells which in some cases exceed drawdowns in paired Rosebud wells. The impact to water quality has not been investigated yet but the hydraulic connection indicates a potential for poor quality water moving into the deeper aquifers. These are the same aquifers that are being depended on to replace mined out water supplies. Although impacts are possible, it is unlikely that these aquifers will be degraded to the degree that the water is unusable.

C. Surface Water

None of the streams in the proposed mine area meet the alluvial valley floor criteria of having sufficient water to support agricultural activities as required by Montana Dept. of State Lands.

During active mining significantly reduced flows are expected in the headwaters of West Fork Armells Creek where large areas of the upper drainages will be disrupted. The headwaters area that will be disrupted makes up only a small percentage of the total drainage area of West Fork Armells Creek. Consequently, these disruptions will reduce flows in the major drainage only slightly since the mining in the headwaters area will disrupt only a small part of the total drainage area. Pre-mining channel morphology and gradient have been documented by longitudinal and cross-sectional channel profiles. This information will be used by Western Energy to reclaim channels of mined out streams to premining conditions and has been incorporated into the hydrologic plan for the mine.

Total dissolved-solids concentrations in surface water could increase because of spoils water discharging into streams. These

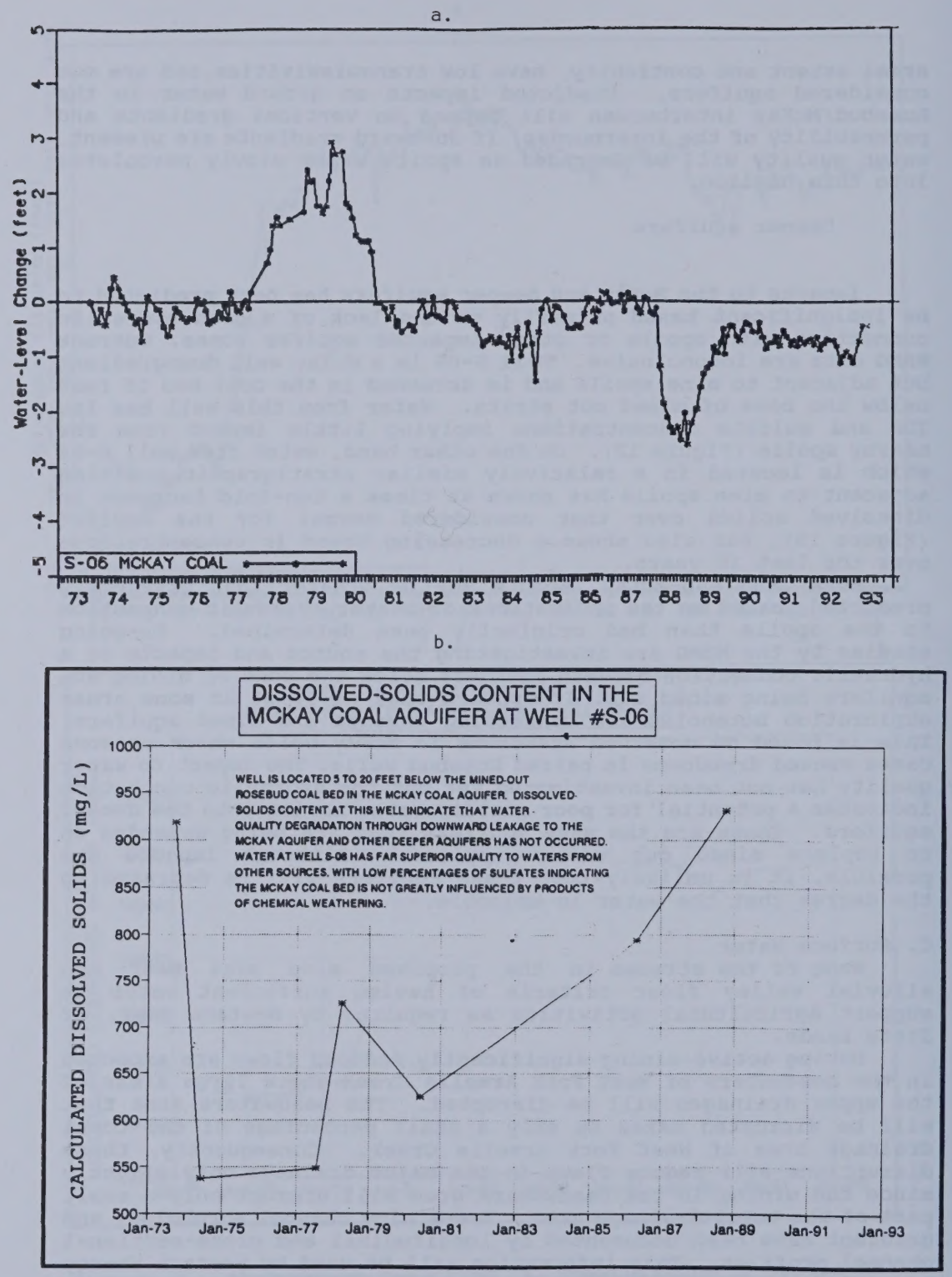

a.
Water-Level Change (feet)
5
4
3
2
1
0
-1
-2
-3
-4
-5
S-06 MCKAY COAL
73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93
b.
DISSOLVED-SOLIDS CONTENT IN THE MCKAY COAL AQUIFER AT WELL #S-06
WELL IS LOCATED 5 TO 20 FEET BELOW THE MINED-OUT ROSEBUD COAL BED IN THE MCKAY COAL AQUIFER. DISSOLVED-SOLIDS CONTENT AT THIS WELL INDICATE THAT WATER-QUALITY DEGRADATION THROUGH DOWNWARD LEAKAGE TO THE MCKAY AQUIFER AND OTHER DEEPER AQUIFERS HAS NOT OCCURRED. WATER AT WELL S-06 HAS FAR SUPERIOR QUALITY TO WATERS FROM OTHER SOURCES, WITH LOW PERCENTAGES OF SULFATES INDICATING THE MCKAY COAL BED IS NOT GREATLY INFLUENCED BY PRODUCTS OF CHEMICAL WEATHERING.
CALCULATED DISSOLVED SOLIDS (mg/L)
1000
950
900
850
800
750
700
650
600
550
500
Jan-73 Jan-75 Jan-77 Jan-79 Jan-81 Jan-83 Jan-85 Jan-87 Jan-89 Jan-91 Jan-93

Figure 12. Hydrographs depicting (a) water-level fluctuations in the McKay coal at well S-06 and (b) dissolved-solids content in the McKay coal aquifer at well S-06.

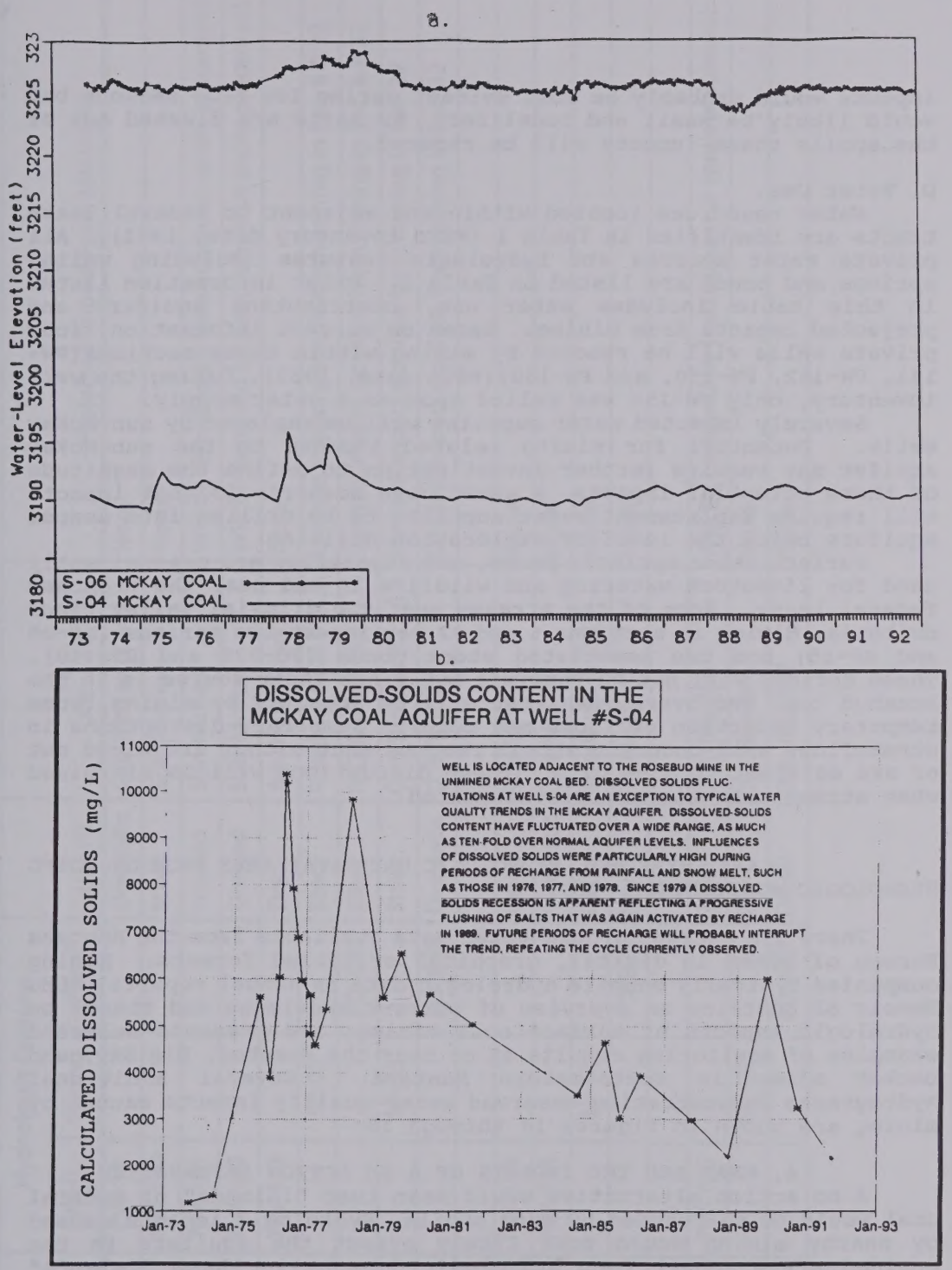

a.
Water-Level Elevation (feet)
3180 3190 3195 3200 3205 3210 3215 3220 3225 323
S-06 MCKAY COAL
S-04 MCKAY COAL
73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92
b.
DISSOLVED-SOLIDS CONTENT IN THE MCKAY COAL AQUIFER AT WELL #S-04
CALCULATED DISSOLVED SOLIDS (mg/L)
11000
10000
9000
8000
7000
6000
5000
4000
3000
2000
1000
WELL IS LOCATED ADJACENT TO THE ROSEBUD MINE IN THE UNMINED MCKAY COAL BED. DISSOLVED SOLIDS FLUCTUATIONS AT WELL S-04 ARE AN EXCEPTION TO TYPICAL WATER QUALITY TRENDS IN THE MCKAY AQUIFER. DISSOLVED-SOLIDS CONTENT HAVE FLUCTUATED OVER A WIDE RANGE, AS MUCH AS TEN-FOLD OVER NORMAL AQUIFER LEVELS. INFLUENCES OF DISSOLVED SOLIDS WERE PARTICULARLY HIGH DURING PERIODS OF RECHARGE FROM RAINFALL AND SNOW MELT, SUCH AS THOSE IN 1976, 1977, AND 1978. SINCE 1979 A DISSOLVED-SOLIDS RECESSION IS APPARENT REFLECTING A PROGRESSIVE FLUSHING OF SALTS THAT WAS AGAIN ACTIVATED BY RECHARGE IN 1989. FUTURE PERIODS OF RECHARGE WILL PROBABLY INTERRUPT THE TREND, REPEATING THE CYCLE CURRENTLY OBSERVED.
Jan-73 Jan-75 Jan-77 Jan-79 Jan-81 Jan-83 Jan-85 Jan-87 Jan-89 Jan-91 Jan-93

Figure 13. Water-level fluctuations in the McKay coal at (a) wells S-06 and S-04 downgradient of mine spoils and (b) dissolved-solids content in the McKay coal aquifer at well S-04.

impacts would probably be most evident during low flow seasons but would likely be small and localized. As salts are flushed out of the spoils these impacts will be reduced.

D. Water Use.

Water resources located within and adjacent to Federal lease tracts are identified in Table 1 (WECo inventory data, 1983). All private water sources and hydrologic features including wells, springs and ponds are listed in Table 1. Other information listed in this table includes water use, contributing aquifer, and projected impacts from mining. Based on current information, four private wells will be removed by mining within these sections(PW-141, PW-142, PW-150, and PW-160)(WECo data, 1983). During the well inventory, only PW-150 was relied upon as a water supply.

Severely impacted water supplies will be replaced by sub-McKay wells. Potential for mining related impacts to the sub-McKay aquifer may require further investigation to define the magnitude of these potential impacts. A worst case scenario is that impacts will require replacement water supplies to be drilled into deeper aquifers below the level of exploration drilling.

Surface water springs, ponds, and streamflow are predominantly used for livestock watering and wildlife in and near the proposed federal lease. None of the streams meet the alluvial valley floor criteria. Mining in sections 6 and 32 may impact two springs (SP-05 and SP-55) and two associated stock ponds (PO-938 and PO-940). These springs will not be removed; but since their source is in the Rosebud coal and overburden that will be impacted by mining, some temporary reduction of flows may occur. Temporary disruptions in streamflows will occur in stream reaches that either are mined out or are adjacent to mine pits. These disruptions will be minimized when stream channels are reconstructed.

3. ARE THERE NEW HYDROLOGIC DATA AVAILABLE FROM ON-GOING HYDROLOGIC MONITORING? YES.

There are current ground-water data available from the Montana Bureau of Mines in digital, graphical or tabled formats. Mining companies typically compile hydrologic data in annual reports. MBMG Memoir 62 contains an overview of current knowledge and theory on hydrologic aspects of surface coal mining; and presents selected examples of monitoring results at or near the Rosebud, Big Sky, and Decker mines in southeastern Montana. Several additional hydrographs demonstrating observed water-quality impacts caused by mining are shown in Figures 14 through 19.

4. WHAT ARE THE IMPACTS OF A NO ACTION ALTERNATIVE?

A no action alternative would mean that "islands" of federal coal would be surrounded by mine spoils. Hydrologic impacts caused by nearby mining would most likely affect the aquifers in the unmined areas. Short term hydrologic impacts in these "islands" would undoubtedly be diminished because the coal would not have been removed. Long term hydrologic impacts of a no action alternative would likely be similar to those predicted under the existing mining application since coal in a much larger surrounding area would have been replaced with spoils.

TABLE 1
HYDROLOGIC FEATURES LOCATED WITHIN AND ADJACENT TO THE FEDERAL ('82) LEASE TRACTS

Federal Lease Section	Hydrologic Feature			Use (1)	Aquifer	Projected Impact From Mining (2)
	Well	Spring	Pond			
T 2N, R40E Sec. 32	PW-18			Domestic	Sub-McKay (S.M.)	None
(Area C)	PW-140			Stock	Sub-McKay	None
	PW-141			Unused	Sub-McKay	Will be removed by boxcut/boxcut spoils placement
	PW-142			Unused	Sub-McKay	Will be removed by boxcut/boxcut spoils placement
	PW-143			Dry	Alluvium (Alluv.)	None
		SP-05		Stock	Rosebud Coal (R.C.)	Limited impact possible from mining in Sec. 6 & 32
			PO-938	Stock	R.C./Runoff (R.O.)	Limited impact possible from mining in Sec. 6 & 32
		SP-55		Stock	Overburden (O.B.)	Limited impact possible from mining in Sec. 32
			PO-940	Domestic	O.B./Runoff	Limited impact possible from mining in Sec. 32
(3)	PW-139			Dry	Sub-McKay	None
	PW-144			Domestic	Sub-McKay	None
		SP-53		Dry	Interburden (I.B.)	None
			PO-936	Dry	I.B./Runoff	None
T 1N, R39 E Sec. 2	PW-150			Stock	Overburden	Will be removed by boxcut/boxcut spoils placement
(Area C)		SP-66		Dry	Overburden	None
			PO-973	Dry(4)	O.B.,/Runoff	None

TABLE 1 (Continued)

Federal Lease Section	Hydrologic Feature			Use (1)	Aquifer	Projected Impact From Mining (2)
	Well	Spring	Pond			
(5)		SP-33		Dry	Alluv./O.B.	None
			PO-922	Stock	Runoff	None
			PO-923	Stock	R.O./Alluv./O.B.	None
T1N, R40E Sec. 6	PW-160			Unused	Unknown	Will be removed by mining
(Area C)						
(6)	PW-110			Unused	Rosebud/McKay Coal	None
	PW-17			Stock	Sub-McKay	None
	PW-89			Stock	Interburden	None
T 1N, R40E Sec. 8			PO-937	Dry	Runoff	None
(Area C)						
T 1N, R40E Sec. 14	PW-01			Domestic	Alluv./I.B.	No impact from mining in Section 14
(Area B)	PW-35			Stock	Alluv./I.B.	No impact from mining in Section 14

(1) "Use" status is based on original inventory data (1983).
(2) Qualitative estimates of projected impacts to water quality and availability are based on mining within the Federal Section only
(3) Hydrologic features located adjacent to Section 32, in T2N, R40E, Sec. 29
(4) Was developed for stock; dam has breached
(6) Hydrologic features located adjacent to Section 6, in T 2N, R40E, Sec. 31 (PW-110 & PW-17); and in T 1N, R40E Section 5 (PW-89).

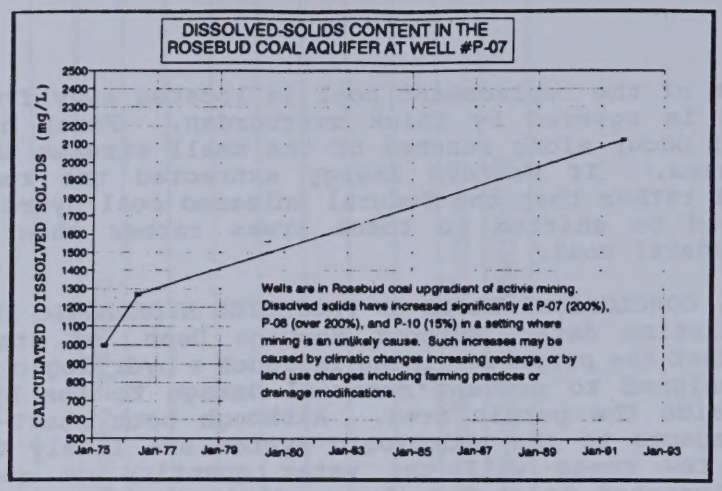
awd/0153/273a

Most of the replacement coal is located away from stream valleys and is covered by thick overburden. Fewer hydrologic impacts will occur along reaches of the small streams that cross federal leases. If Western Energy extracted the replacement minable coal rather than the Federal unleased coal hydrologic impacts would be shifted to these areas rather than the land overlying federal coal.

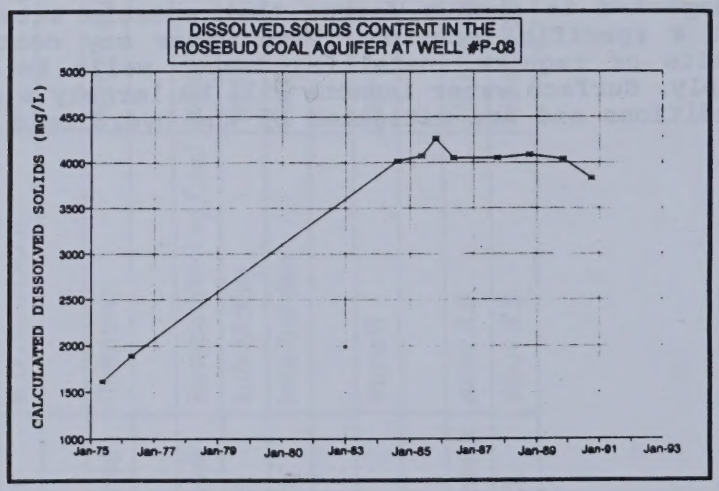
5. CONCLUSIONS BASED ON PROJECTED HYDROLOGIC IMPACTS

The existing data support Montana Dept. of State Lands assessment that the proposed mining includes a hydrologic plan that has been designed to prevent material damage to the hydrologic balance outside the permit area. Although both short-term and long-term impacts to the hydrologic system are likely to occur, only in a few cases will the water quantity or quality be negatively impacted to such a degree that useable water is not available at a specific location. The water may contain more dissolved salts or require installing deeper wells to reach an adequate supply. Surface water impacts will be largely a result of climatic conditions and are mitigated by the hydrologic plan for the mine.

(a)



(b)



(c)

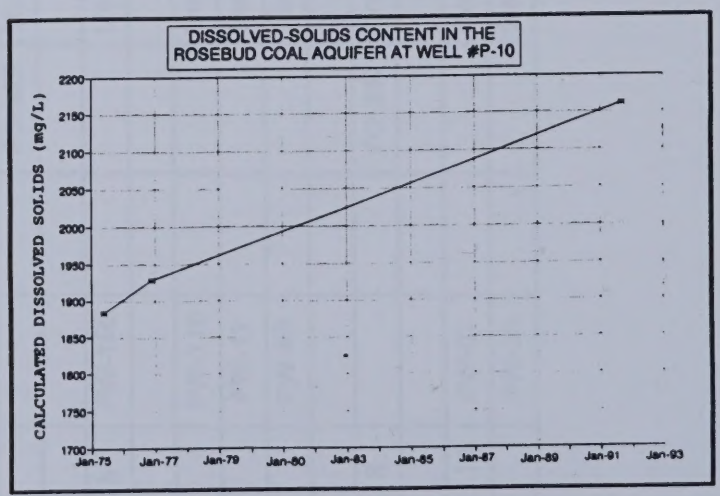


Figure 14. Hydrographs depicting water quality fluctuations in the Rosebud coal aquifer at (a) well P-07 (b) well P-08, and (c) well P-10.

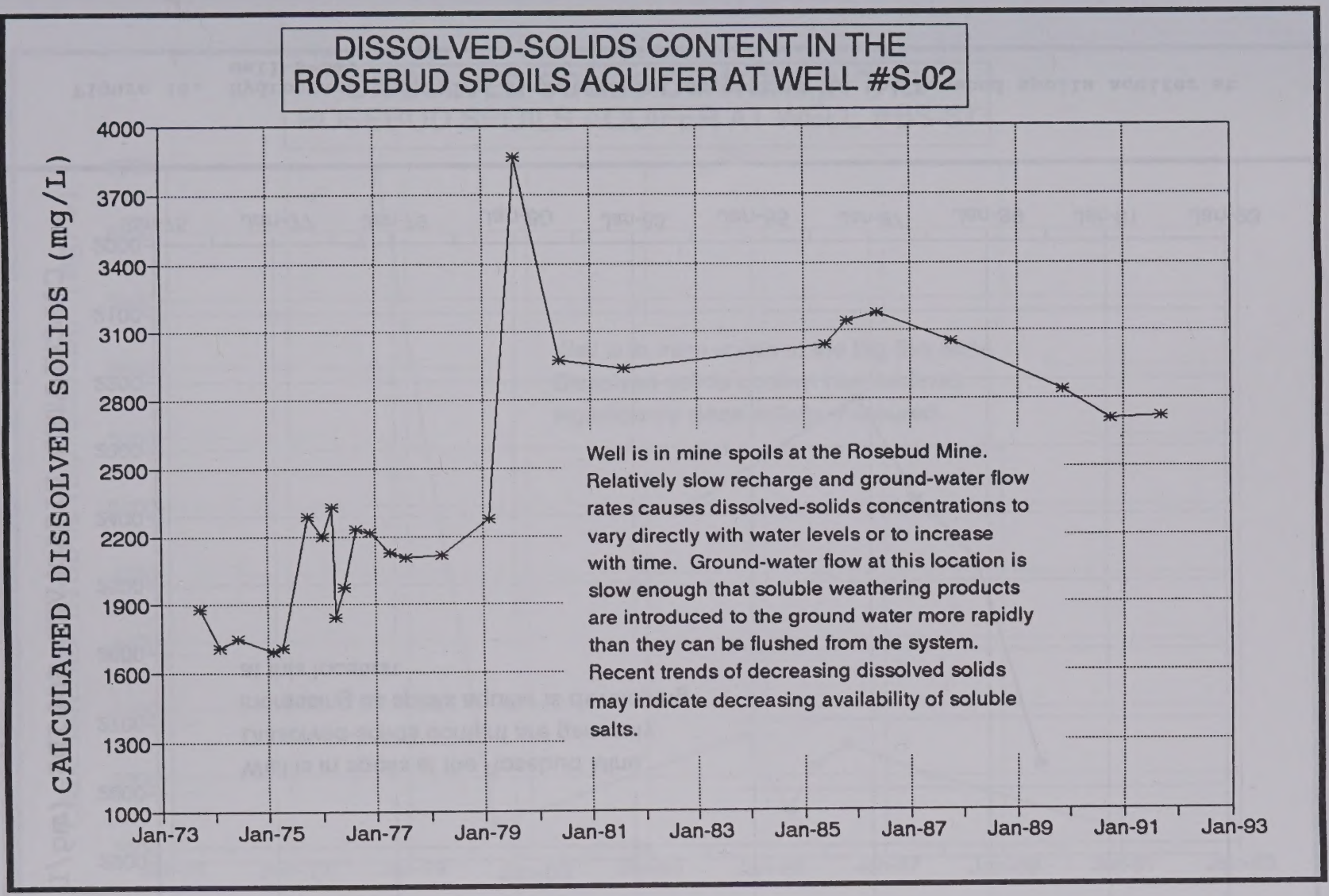

DISSOLVED-SOLIDS CONTENT IN THE ROSEBUD SPOILS AQUIFER AT WELL #S-02
CALCULATED DISSOLVED SOLIDS (mg/L)
4000
3700
3400
3100
2800
2500
2200
1900
1600
1300
1000
Jan-73
Jan-75
Jan-77
Jan-79
Jan-81
Jan-83
Jan-85
Jan-87
Jan-89
Jan-91
Jan-93
Well is in mine spoils at the Rosebud Mine. Relatively slow recharge and ground-water flow rates causes dissolved-solids concentrations to vary directly with water levels or to increase with time. Ground-water flow at this location is slow enough that soluble weathering products are introduced to the ground water more rapidly than they can be flushed from the system. Recent trends of decreasing dissolved solids may indicate decreasing availability of soluble salts.

Figure 15. Hydrograph depicting dissolved-solids content in the McKay coal aquifer at well S-02.

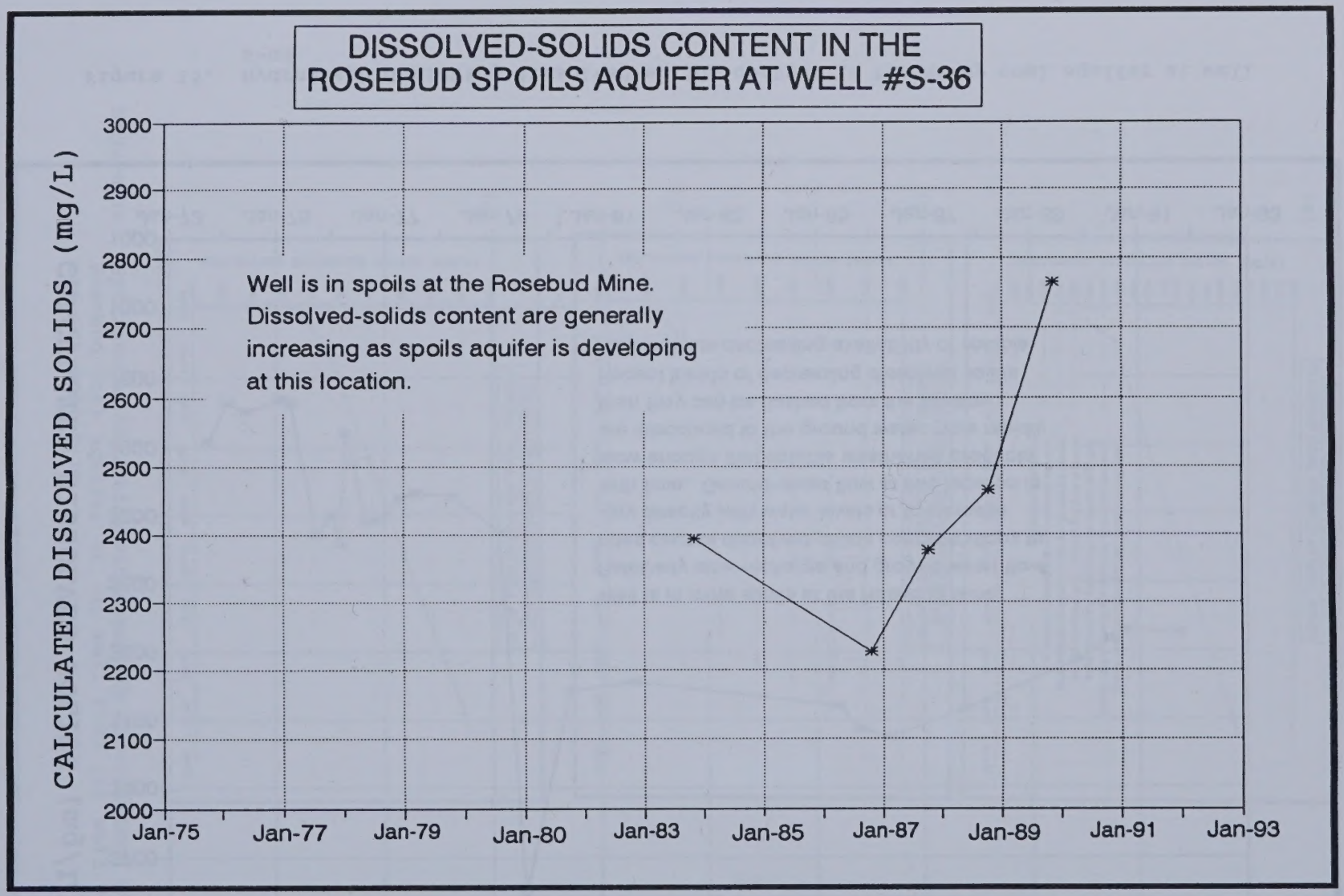


Figure 16. Hydrograph depicting dissolved-solids content in the Rosebud spoils aquifer at well S-36.

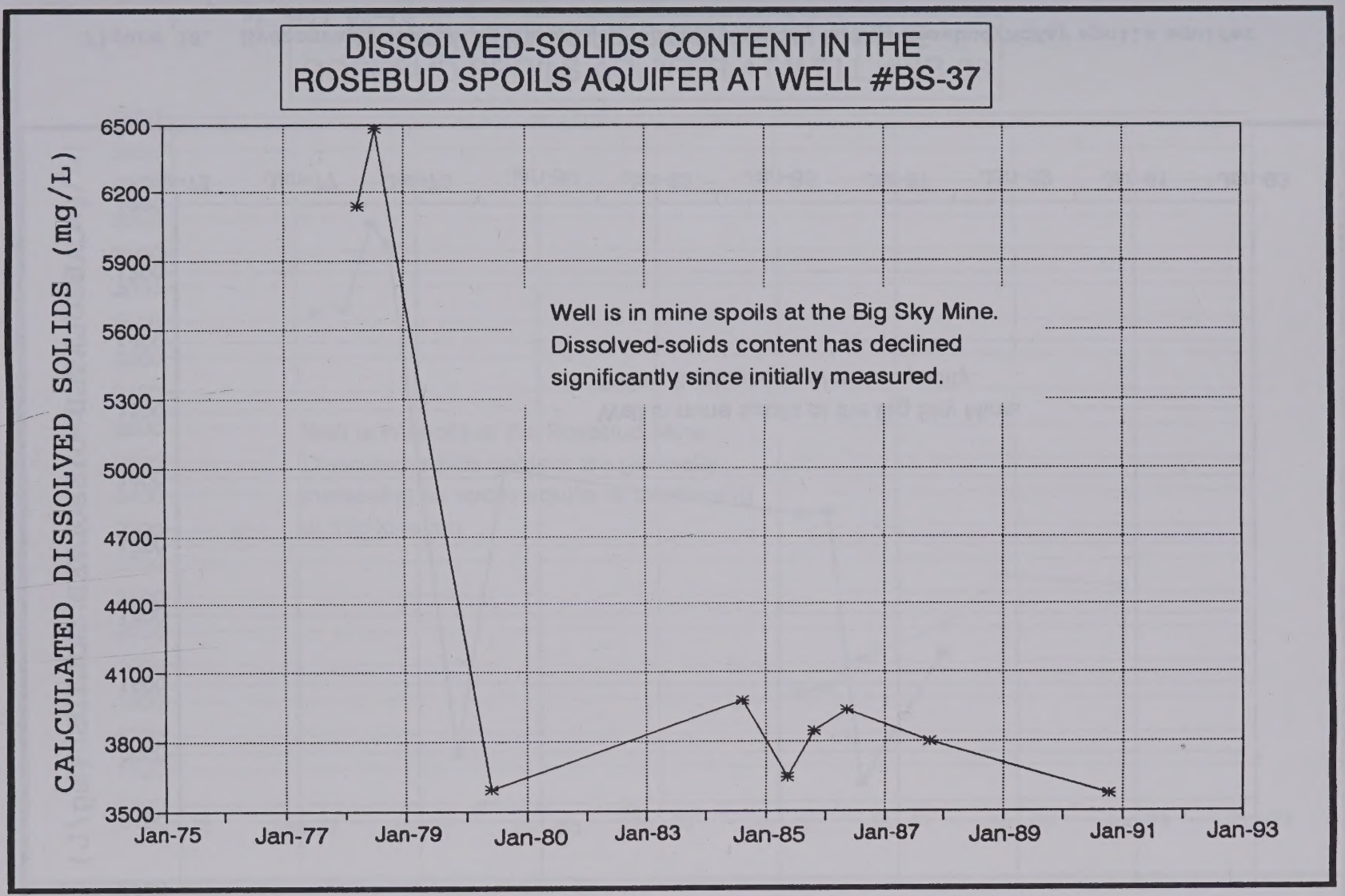


Figure 17. Hydrograph depicting dissolved-solids content in the Rosebud spoils aquifer at well BS-37.

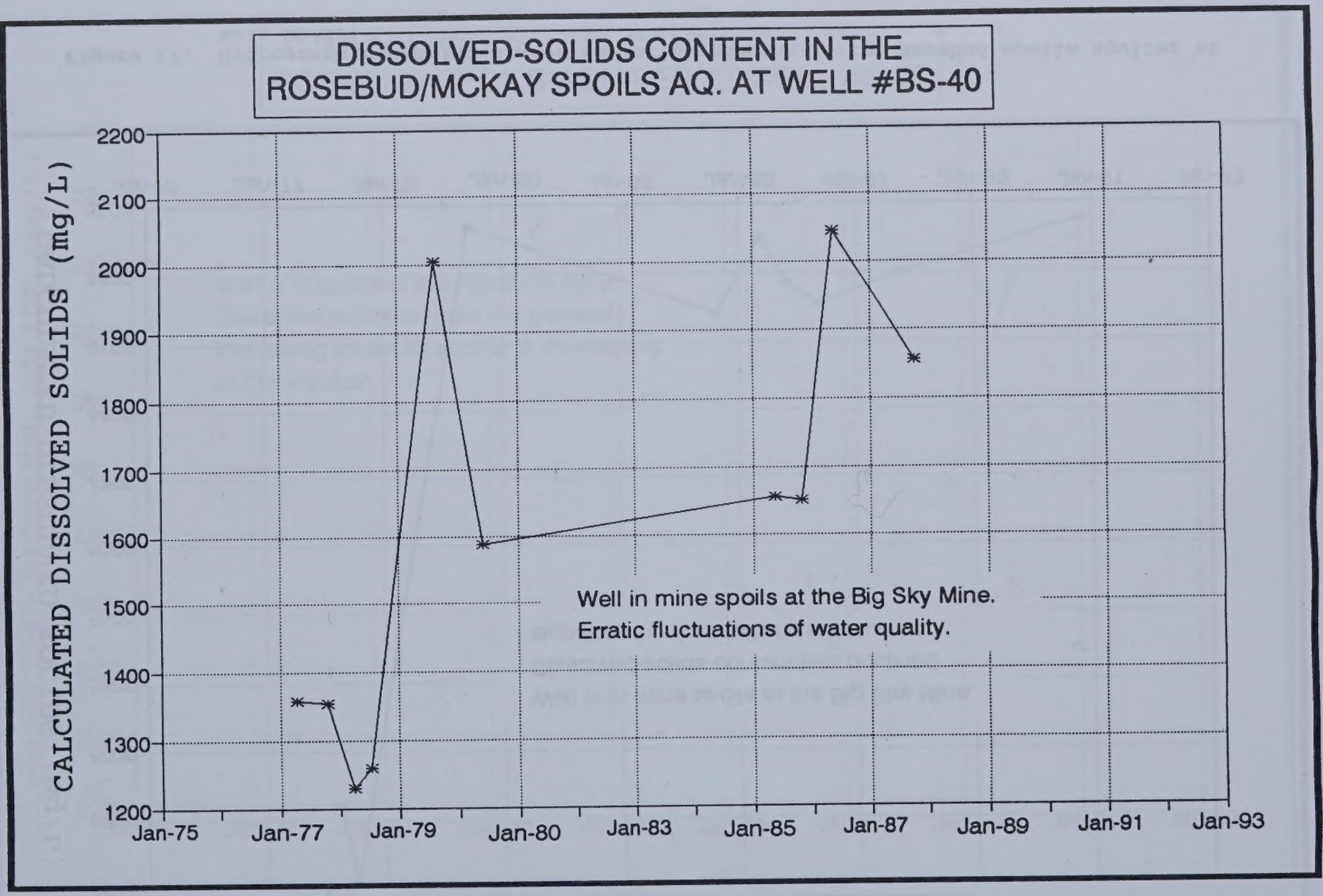


Figure 18. Hydrograph depicting dissolved-solids content in the Rosebud/McKay spoils aquifer at well BS-40.

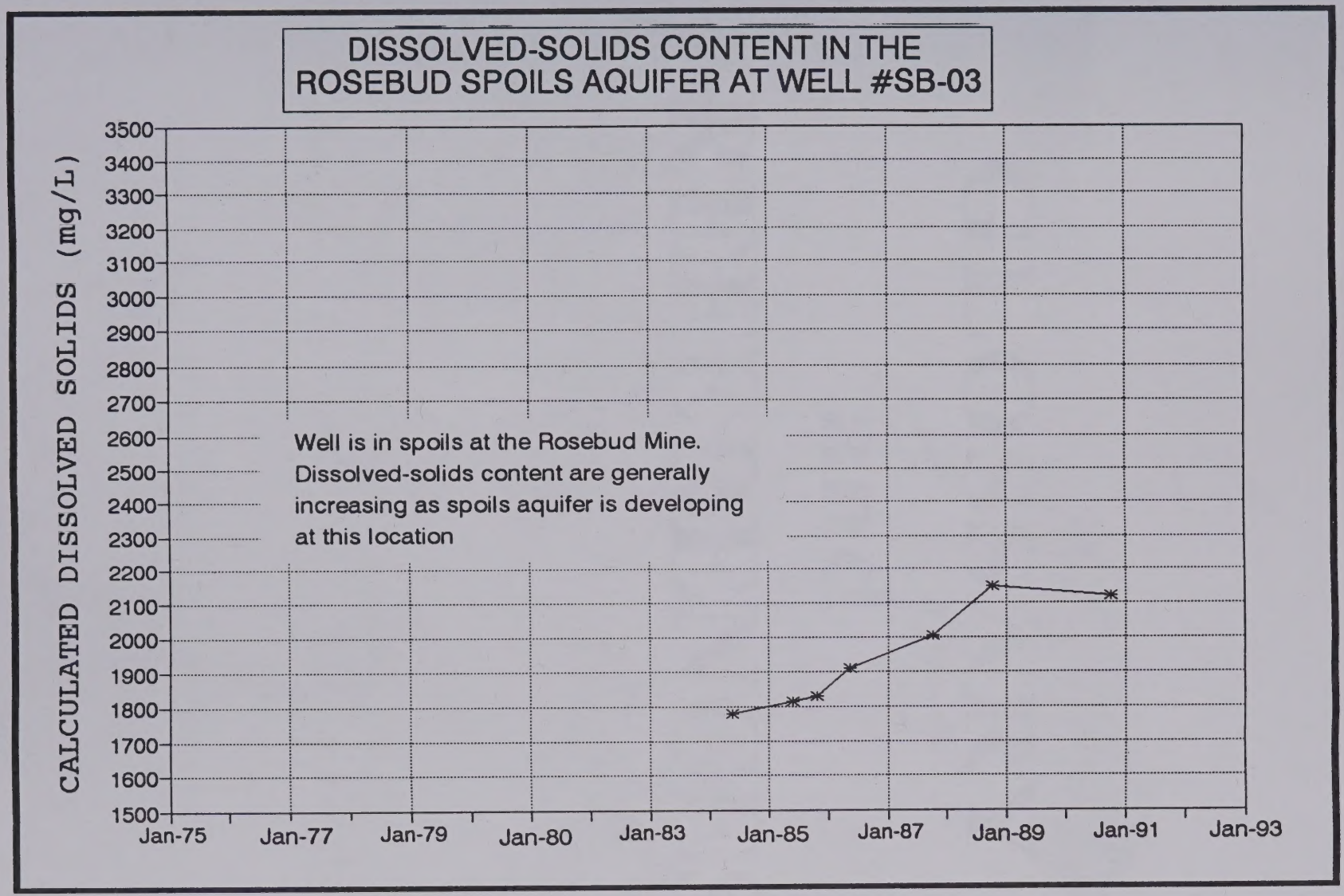
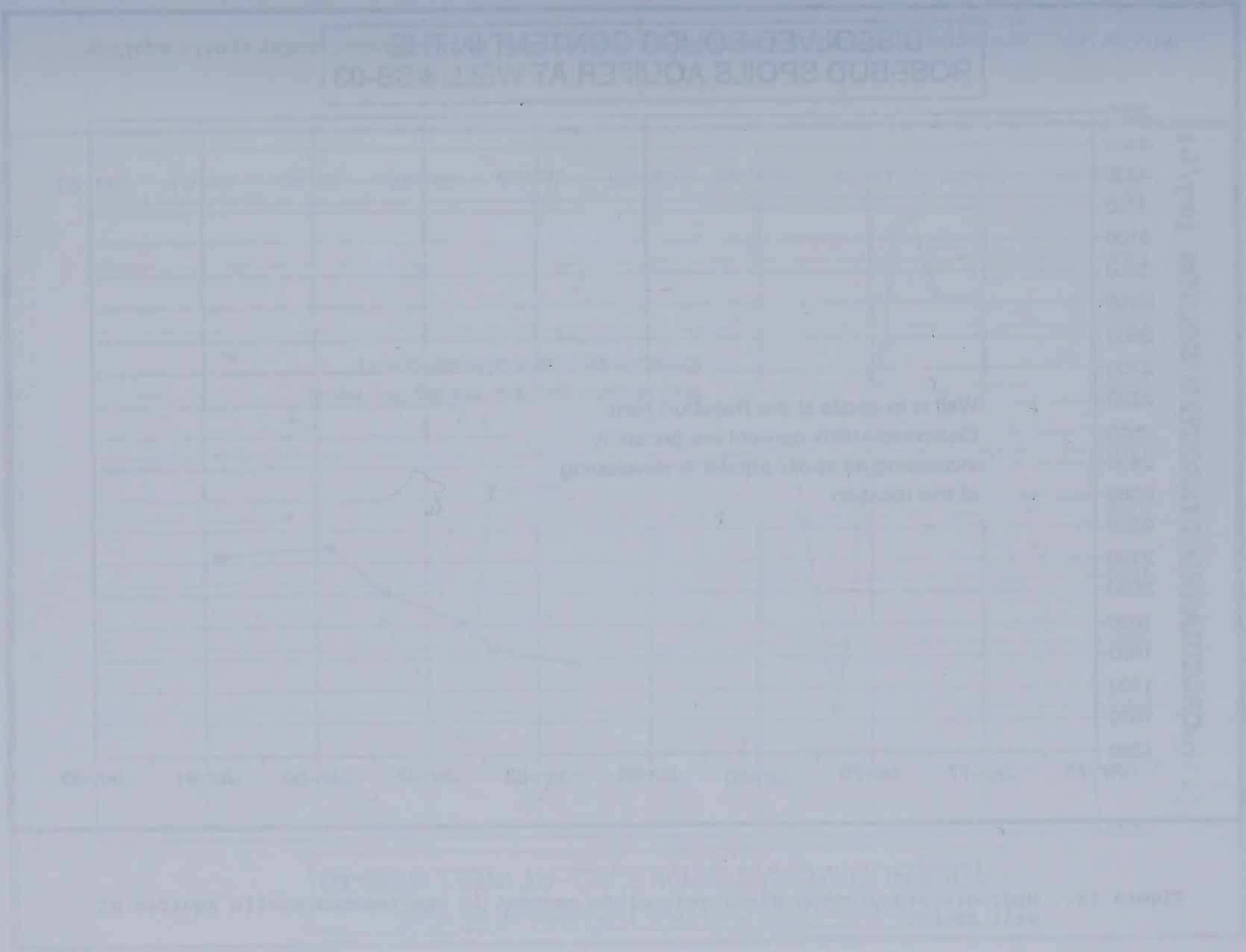


Figure 19. Hydrograph depicting dissolved-solids content in the Rosebud spoils aquifer at well SB-03.



GLOSSARY and REFERENCES

GLOSSARY

ANION. A negatively charged ion.

ARIDISOLS. Light-colored mineral soils of and climates with accumulations of carbinate, salt, and gypsum; soils of arid climates.

BICARBONATE. An acid carbonate; a salt of carbonic acid.

BIGHORN UPLIFT. The Bighorn Mountains; forms the west margin of the Powder River basin and separates it from the Bighorn basin.

BLACK HILLS UPLIFT. The Black Hills; an elongate dome or uplift formed during Laramide time; forms east margin of the Powder River basin.

CAMBRIAN. The earliest geologic period of the Paleozoic Era or the corresponding system of rocks.

CASPER ARCH. An area near Casper, Wyoming where the sedimentary deposits have thinned over a basin high point; separates the Powder River basin from the Wind River basin.

CONTEMPORARY USE AREAS. Prayer and offering locales which are currently in use for ceremonial purposes, or locations from which resources are gathered for medicinal and ceremonial uses. See appendix 9 for an expanded definition.

CRETACEOUS. The final period of the Mesozoic Era having covered the span of time between 135 and 65 million years ago; the corresponding system of rocks.

CULTURAL PROPERTY. Is a definite location of past human activity, occupation or use identifiable through field inventory (survey), historical documentation or oral evidence. The term includes archeological, historical or architectural sites, structures or places with important public and scientific uses and may include traditional cultural or religious importance to specified social and/or cultural groups. Cultural properties are concrete, material places and things that are classified, ranked and managed through the system of inventory, evaluation, planning, protection and utilization.

DECIBEL. A unit for measuring sound intensity.

ENTISOLS. Light-colored soils that do not have natural genetic horizons or that have only weakly expressed beginnings of such horizons.

EOCENE. An epoch of the lower Tertiary period, after the Paleocene and before the Oligocene; the corresponding series of rocks.

EPHEMERAL. A stream that flows only after rains or during snowmelt and whose channel is at all times above the water table.

FORT UNION FORMATION. Formation in Montana and Wyoming consisting of 1,500 feet or more of alternating beds of sandstone and shale; consists of three members, the Tongue River Member (coal-bearing formation), at top the Lebo (shale) Member, and the Tullock Member at the base. East of the Powder River, the Lebo and Tullock are combined in the Ludlow Member.

GREAT PLAINS PHYSIOGRAPHIC PROVINCE. Plains area west of the Missouri River to the Rocky Mountains; covers eastern Montana and Wyoming, northern Colorado, southern Saskatchewan, and most of North and South Dakota.

HARTVILLE UPLIFT. Pre-Cambrian uplift basin in Wyoming; forms southern boundary of the Powder River basin and separates it from the Denver basin.

LARAMIDE. A time of deformation whose several phases extended from late Cretaceous until the end of the Paleocene.

MICRON. One millionth of a meter.

MILES CITY ARCH. An area south of Miles City, Montana, where the sedimentary deposits have thinned over a high point; forms the northern boundary of the Powder River basin.

MOLLISOLS. Soils that formed under grass and have a thick, dark-colored surface horizon rich in organic material.

PALEOCENE. An epoch of the early Tertiary Period, after the Cretaceous Period and before the Eocene Epoch; the corresponding system of rocks.

PALEOZOIC. An era of geologic time, from the end of the Pre-Cambrian to the beginning of the Mesozoic, or from about 570 to about 225 million years ago.

PHYSIOGRAPHIC. The description of the physical geography of an area.

PM-10 STANDARDS. Air quality measurement; particulates less than 10 microns in diameter.

PRE-CAMBRIAN. All geologic time and its corresponding rocks, before the beginning of the Paleozoic; it is equivalent to about 90 percent of geologic time.

PRETECTONIC. The period of time before the forces involved act upon a structure or feature.

SALINE. Salty or saltlike.

INTANGIBLE SPIRITUAL ATTRIBUTES. Sites, landforms, or landscapes that have spirits or a spiritual relationship associated with them. See appendix 9 for an expanded definition.

STRATA. A sheetlike mass of sedimentary rock or earth of one kind lying between beds of other kinds.

SUBBITUMINOUS. Nonagglomerating coal with BTU values ranging from 8,300 to 11,500 per pound, on a moist, mineral-matter free basis.

TRADITIONAL CULTURAL PROPERTY. Sites, objects, districts, or landscapes that qualify for nomination to the National Register of Historic Places from the perspective of: Indian history and culture based on their association with events that have made a significant contribution to the broad patterns of history (criterion A); association with a culturally significant individual (criterion B); embodiment of the distinctive characteristics of a type, period, or method of construction (criterion C); or the potential to yield important information about the history or prehistory of the area (criterion D). See appendix 9 for an expanded definition.

TRADITIONAL LIFEWAY VALUE. Is the quality of being useful in or important to the maintenance of a specified social and/or cultural group's traditional systems of religious belief, cultural practice or social interaction, not closely identified with definite locations. Another group's shared values are abstract, nonmaterial, ascribed ideas that one cannot know about without being told. Traditional lifeway values are taken into account through public participation during planning and environmental analysis.

TRIASSIC. The first period of the Mesozoic Era to have covered the span of time between 225 and 190 million years ago, the corresponding system of rocks.

UNSUITABILITY CRITERIA. The 20 criteria described in 43 CFR 3461, the application of which results in an assessment of federal coal lands as suitable or unsuitable for surface coal mining.

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